British Medical Journal.

JULY 19TH, 1919.

CONTENTS.

ORIGINAL ARTICLES.

A Lecture on the Symptoms, Causes, and Prevention of Anoxaemia (Insufficient Supply of Oxygen to the Tissues), and the Value of Oxygen in its Treatment. By J. S. HALDANE, M.D., F.R.S. (Illustrated). 65

War Lessons as Applied to Civil Practice. By ROBERT SANDERSON, M.B., B.Ch., Captain R.A.M.C.(T.F.). 71

Note on Re-amputation. By A. E. CHISHOLM, F.R.C.S.Ed., late Captain R.A.M.C. 73

Accidental Transference of the Malarial Parasite in the Course of Transfusion. By ALFRED S. GUBB, M.D. 74

MEMORANDA.

Appendical Pus in a Hernia Sac Simulating Strangulated Hernia. By CHARLES BENNETT, M.B. 75

Hallux Valgus Operation. By W. B. COSENS, Major R.A.M.C. 75

REVIEWS.

Sterility in Women 75
Nutrition and Disease 76
Infection, Immunity, and Specific Therapy 76
Diseases of Heart and Aorta 76
Notes on Books 77

UNIVERSITIES AND COLLEGES.

UNIVERSITY OF OXFORD 94
UNIVERSITY OF MANCHESTER 94
UNIVERSITY OF BIRMINGHAM 94
UNIVERSITY OF BRISTOL 94
UNIVERSITY OF EDINBURGH 94
UNIVERSITY OF GLASGOW 94
UNIVERSITY OF ABERDEEN 94
UNIVERSITY OF DUBLIN 95
QUEEN'S UNIVERSITY, BELFAST 95
ROYAL COLLEGE OF SURGEONS OF ENGLAND 95
ROYAL COLLEGE OF SURGEONS OF EDINBURGH 95

LEADING ARTICLES.

THE THERAPEUTICS OF OXYGEN 81
THE REPRESENTATIVE MEETING 81

THE WEEK.

Insurance for Medical Men 82
A Floating School of Tropical Medicine. 83
The Museum of the Royal College of Surgeons of England 83
Accessory Food Factors 84
International Priority 84
The Civil List Pensions 84

GENERAL ARTICLES AND NEWS.

PRESENTATION TO SIR WILLIAM OSLER 80
CALCUTTA SCHOOL OF TROPICAL MEDICINE AND HYGIENE. (Illustrated) 79
HARROGATE SPA 78
LIQUID AIR AS A SOURCE OF OXYGEN. 77
GAS-OXYGEN APPARATUS. (Illustrated). 77
MEDICAL BOARDS OF THE MINISTRY OF PENSIONS 86
THE BRITISH FEDERATION OF MEDICAL AND ALLIED SOCIETIES 86
MEDICAL NOTES IN PARLIAMENT:
National Insurance Bill, 1919 85
MEDICAL NEWS 95

LOCAL NEWS.

ENGLAND AND WALES—
Housing in London 86
Dr. Campbell of Bradford 86
SCOTLAND—
Chair of Clinical Surgery, Edinburgh. 87
Sir Thomas Fraser 87

OBITUARY.

Frederick Page, M.D.Edin., M.A., D.C.L.Durham, F.R.C.S. 93
Robert Craig Maclagan, M.D., F.R.C.P. Edin. 93
Robert Abernethy, M.D., F.R.C.P.Edin. 93

THE SERVICES.

Honours 95

CORRESPONDENCE.

Reconstruction of the Territorial Medical Service 87
Medical and Surgical Directorates for the Army Medical Service. By Sir Henry Gray, K.B.E., C.B., C.M.G., F.R.C.S.Edin. 87
Kala-azar in Mesopotamia. By J. C. G. Ledingham, C.M.G., Lieut.-Colonel R.A.M.C. 88
Accessory Food Factors and the Intestine. By F. John Poynton, M.D. 88
Hyperpyrexial Heatstroke. By H. C. Sinderson, Captain R.A.M.C.(S.R.) 89
Toxic Symptoms following Aspirin. By R. T. Williamson, M.D., F.R.C.P. 89
Prevention of Hydrophobia. By R. D. Jameson, Surgeon Commander, R.N. 89
Sudden Death under an Anaesthetic. By Ernest J. Beards, M.R.C.S., L.R.C.P.; J. Fredk. W. Silk, M.D.; Francis E. Shipway, M.D.; and John F. O'Malley, F.R.C.S., Temp. Major R.A.M.C. 89
Efficient Treatment of the Chronic Running Ear. By E. Duke, Captain, late R.A.M.C. 90
Infective Catarrhs—So-called "Colds." By James E. Blomfield, M.A., M.D. 90
Insurance Terms and Conditions. By W. J. Gilpin, M.B.E., L.R.C.P., M.R.C.S.; and T. P. Gostling, L.R.C.P., M.R.C.S. 90
Reform of Public Health Administration 91
Medical Appointments under the Ministry of Pensions 91
Professional Freedom. By B. G. M. Baskett, M.B., B.Ch. 92

LETTERS AND ANSWERS.

QUERIES, ANSWERS, ETC. 96
VACANT APPOINTMENTS 96

The SUPPLEMENT contains:—

British Medical Association.
Notices as to Annual Representative Meeting, 1919; Annual General Meeting; and Annual Conference of Secretaries.
Meetings of Branches and Divisions.

Insurance:
Meetings of the Profession—Conferences in Scotland, Cardiff, and Nottingham.
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A Lecture
ON THE
SYMPTOMS, CAUSES, AND PREVENTION OF ANOXAEMIA
(INSUFFICIENT SUPPLY OF OXYGEN TO THE TISSUES),
*AND THE VALUE OF OXYGEN IN ITS TREATMENT.**

BY
J. S. HALDANE, M.D., F.R.S.

In this lecture I propose to review briefly what is known with regard to the physiology of anoxaemia, and the means by which it may be prevented. Our knowledge on this subject is as yet imperfect, but has quite recently developed very rapidly; and the development, as I shall try to show, has the closest bearing on a number of everyday problems in practical medicine.

DEFINITION.

Anoxaemia may be defined as a condition in which the rate of supply of oxygen to the tissues by the blood in the systemic capillaries is insufficient for the normal carrying on of life. Its existence is shown by the abnormal symptoms produced, and by the fact that these symptoms are annulled by increasing the rate at which oxygen is supplied.

Clinically the condition is very common. It is a very dangerous complication in pneumonia and in bronchopneumonia, especially the very fatal pneumonia of influenza. It occurs in bronchitis and in asthma, and is constantly in existence in many chronic cardiac cases and in congenital heart disease. It is the cause also of Cheyne-Stokes breathing.

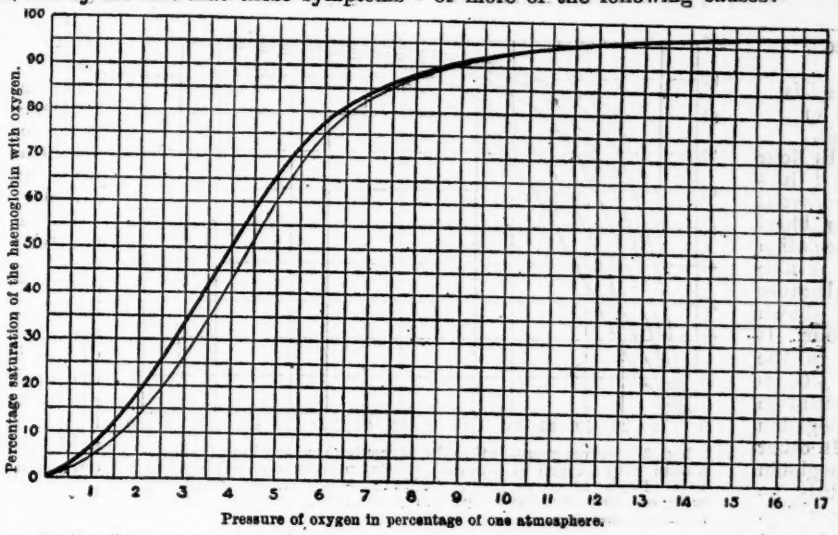

FIG. 1.—Curves representing the percentage saturation of haemoglobin with oxygen in blood of J. S. H. and C. G. D. with different partial pressures of oxygen at 38° C. Thick line in presence of 40 mm. pressure of CO_2 (the pressure in alveolar air); thin line in the blood passing round the circulation, with a varying pressure of CO_2. (1 per cent. of atmosphere = 7.6 mm. of mercury.)

I need hardly remind you that the place of oxygen in the life of a warm-blooded animal is altogether peculiar, since the body has practically no storage capacity for oxygen, but depends from moment to moment for its supply from the air. If we cut off this supply loss of consciousness is only a matter of seconds, and death of minutes. As Paul Bert was the first to point out, the immediate cause of death is practically always anoxaemia. But death is not the mere stoppage of a machine; it is also total ruin of the supposed machinery. Similarly—and this is a lesson which I wish to emphasize as strongly as I can—partial anoxaemia means not a mere slowing down of life, but progressive and perhaps irreparable damage to living structure.

MAINTENANCE OF NORMAL SUPPLY OF OXYGEN TO THE TISSUES.

To grasp the causes of anoxaemia it is necessary to understand quantitatively the means by which the rate at which oxygen is given off from the blood towards the tissues is normally kept sufficient. As is well known, the available oxygen present in the blood is in two forms. A small part (about $\frac{1}{50}$th in normal human arterial blood) is present in free solution in the blood. By far the greater part is combined with haemoglobin as an easily dissociated compound, oxyhaemoglobin, which dissociates, and so yields free oxygen, as the oxygen in free solution is used up. Human arterial blood is almost (about 95 per cent.) saturated with oxygen. The readiness with which oxygen is supplied towards the tissues depends on the partial pressure, or diffusion pressure,† of the oxygen in free solution. *Thus it is the oxygen in free solution, and not the total available oxygen in the blood, that is of immediate importance.* In proportion as oxygen is taken up from the blood in the systemic capillaries the amount of oxygen in free solution, and consequently its diffusion pressure, tends to fall, but is, under normal conditions, kept from falling too low by oxygen flowing out from the oxyhaemoglobin in the red corpuscles. Fig. 1 (after Christiansen, Douglas, and Haldane) is a curve showing the percentage to which the oxyhaemoglobin in human blood is dissociated with varying partial pressure, or diffusion pressure, of the free oxygen present. The peculiar form of the curve with its evident physiological significance was discovered by Bohr of Copenhagen, while Barcroft and his pupils showed that the peculiarity depends upon the salts present in the red corpuscles.

CAUSES OF ANOXAEMIA.

Anoxaemia, or excessive fall of the diffusion pressure of oxygen in the systemic capillaries, is due to one or more of the following causes:

1. Defective saturation of the arterial blood with oxygen. 2. Slowing of the circulation, so that an excessive proportion of oxygen is used up in the systemic capillaries. 3. Defective proportion of available haemoglobin in the blood. 4. Alteration of the dissociation curve of oxyhaemoglobin, so that it gives off oxygen less readily.

Of these causes the last has hitherto hardly been recognized, but is of great importance, as will be shown. I shall first discuss briefly these four causes and their mutual relations.

1. *Defective Saturation of the Arterial Blood with Oxygen.*

This depends on one or other of two circumstances. Of these, one is that the partial pressure of oxygen in the lung alveoli may be insufficient to produce normal saturation of the haemoglobin with oxygen. A glance at Fig. 1 will show that if either the percentage of oxygen in the alveolar air, or the barometric pressure, falls sufficiently, defective saturation of the arterial haemoglobin must result unless active secretion of oxygen inwards by the alveolar epithelium redresses the balance. The other is that, owing to swelling, exudation, or other abnormality in or around the alveolar walls, oxygen cannot diffuse inwards quickly enough to saturate the blood during the limited time which it takes to pass through the alveolar capillaries. When the air supply is completely cut off from alveoli, they of necessity collapse, owing to diffusion of nitrogen out of them; and it appears that in this case, or if they are completely filled by exudation, the pulmonary circulation through them practically ceases, so that they do not pass onwards any considerable proportion of venous blood. For this reason, apparently, the

* Delivered at the Physiological Laboratory, Guy's Hospital, June 26th, 1919.

† In a recent paper on the extension of the gas laws to liquids (*Biochemical Journal*, xii, p. 488, 1918) I have endeavoured to define diffusion pressure and point out its fundamental significance in physiology.

arterial blood may remain of a bright red colour, in spite of extensive consolidation or collapse of the lungs.

2. *Slowing of the Circulation.*

The effects of anoxaemia due to slowing of the circulation are seen in ordinary fainting from sudden diminution of the heart's action, or from rapid loss of blood. In the latter case the supply of blood to the right side of the heart fails, so that not sufficient blood reaches the left side to maintain the arterial blood pressure. The blood supply to the right side of the heart may also fail from other causes, such as excessive filling of vessels in some part of the body, or rapid loss of blood plasma. The heart itself may also fail from various causes, primary or secondary. In any case the certain result is anoxaemia, with all its urgent dangers.

3. *Defective Proportion of Available Haemoglobin.*

Anoxaemia due to a defective proportion of available haemoglobin in the blood is seen in extreme cases of primary or secondary "anaemia,"* or in the action of poisons which, like carbon monoxide, nitrites, or arseniuretted hydrogen, combine with, chemically alter, or destroy haemoglobin or red corpuscles. Owing to the defective reserve of combined oxygen in the blood, the partial pressure of free oxygen in the systemic capillaries falls excessively, so that anoxaemia is produced.

4. *Alteration of the Dissociation Curve of Oxyhaemoglobin.*

It was discovered by Bohr of Copenhagen and his pupils that when the partial pressure of CO_2 in blood is altered the dissociation curve for oxygen is also altered. The general nature of this alteration is shown in Fig. 2, after Bohr. It will be seen that as the partial pressure of CO_2 is diminished the dissociation curve of oxyhaemoglobin moves to the left. In other words, the haemoglobin holds on more tightly to the oxygen. Barcroft has shown that other acids in minute quantities have the same effect as carbonic acid.

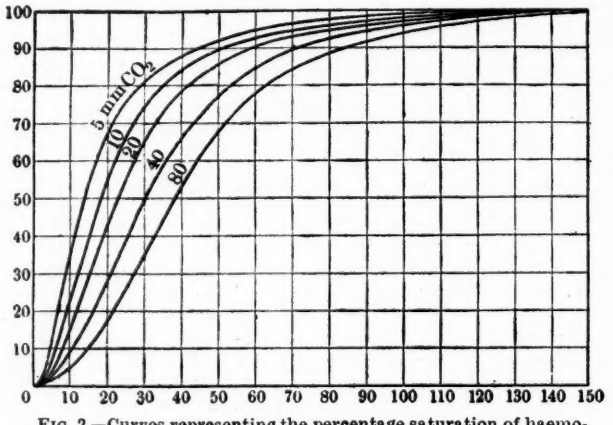

FIG. 2.—Curves representing the percentage saturation of haemoglobin with oxygen at different partial pressures of oxygen and CO_2. Dog's blood at 38° C. Ordinates = percentage saturation with oxygen; abscissae = partial pressures of oxygen in millimetres of mercury.

It is thus in virtue of its acid properties that carbonic acid alters the properties of haemoglobin. Now we can diminish the normal proportion of carbonic acid in the arterial blood by over-ventilating the lungs, as when breathing is voluntarily forced. It will be seen at once that the effect of this must be to make the haemoglobin in the systemic capillaries hold on more tightly than usual to the oxygen. In this way we can produce anoxaemia with the blood of a normal red colour. Forced breathing produces a train of symptoms which are very similar to those produced by a pure anoxaemia, such as that due to reduced atmospheric pressure. It was also discovered by Hill and Flack that when the forced breathing is performed, not with air but with pure oxygen, these symptoms are greatly diminished. As when pure oxygen is breathed the proportion of free oxygen in the blood is much increased, the inference seems plain, in the light of Bohr's discovery, that by forced breathing we actually produce anoxaemia. This is one of Nature's many ironies, and has a far-reaching significance in connexion with our subject.

THE EFFECT ON THE RESPIRATORY CENTRE.

When the respiratory centre is short of oxygen it instantly responds with increased activity, and the corresponding increased breathing brings more oxygen to the lungs. Now when along with deficiency of oxygen there is excess of CO_2 in the lungs, as is usually the case, the increased breathing brings relief in the normal way. But when there is no excess of CO_2 the increased breathing washes out an abnormal proportion of CO_2 from the blood, and, owing to this, produces a secondary anoxaemia. The result is that there is little relief to the primary anoxaemia. Hence a simple anoxaemia of this sort cannot be annulled by mere increased breathing. Similarly, if anoxaemia is due to some cause not associated with increased pressure of CO_2, it cannot be annulled by simply increasing the rate of circulation; for the increased circulation, just like the increased breathing, removes CO_2 as quickly as it brings more oxygen.

These considerations explain why it is that in many cases there is very little increase in either the breathing or the circulation during dangerous anoxaemia. For example, we can understand, from a teleological standpoint, why there should be so little increase in the circulation rate or breathing at very high altitudes or during CO poisoning, and why there should be so little real increase in the lung ventilation in uncomplicated circulatory anoxaemia.

SYMPTOMS PRODUCED BY ANOXAEMIA.

The symptoms of anoxaemia, and the response generally of the body towards it, must now be considered.

When anoxaemia is produced by lowering *rapidly* either the percentage of oxygen in the inspired air, or the atmospheric pressure, the first definite symptom is usually an increase in the breathing; but unless the anoxaemia is great the breathing soon quiets down again more or less.

If the anoxaemia has been *gradually* produced and is not excessive, the increase in breathing is not noticeable, though a definite increase can be recognized from the diminished partial pressure of CO_2 in the alveolar air.

Under normal conditions the activity of the respiratory centre, as Priestley and I discovered, is regulated with astounding exactness by the partial pressure of CO_2 in the alveolar air; and evidence has since then gradually accumulated that it is simply in virtue of its acid properties that the carbonic acid carried from the lungs to the respiratory centre acts on that centre.

It is thus variations in the hydrogen-ion concentration of the blood that normally determine the degree of activity of the centre. Moreover, these variations are for the most part so extraordinarily minute as to be undetectable by the existing methods, whether electrometrical or chemical.†

The significance of this latter fact has not hitherto been realized by medical writers, nor the serious sources of error involved in methods used for comparing the hydrogen-ion concentrations in samples of blood of varying composition. As a result, there is at present a chaos of confused opinions which I cannot stop here to criticize. It is clear, nevertheless, that the hydrogen-ion concentration of the blood is regulated with almost incredible delicacy, and that the respiratory centre does the comparatively rough and immediate work necessitated by rapid variations in CO_2 production within the body, while the kidneys, liver, and probably other parts, do the finer but far slower work.

When want of oxygen comes in as an additional stimulus to the respiratory centre, the result is that if no excess of CO_2 accompanies the want of oxygen, more CO_2 than usual is washed out of the arterial blood. Hence the hydrogen-ion stimulus to the centre becomes latent, and a state of "alkalosis" is produced in the blood. The action of the centre, therefore, quiets down again as soon as time has been given for washing down to a lower level the relatively large quantity of CO_2 contained in the blood and body fluids; and the net final result in increasing the breathing is comparatively small, as Poulton and I showed in 1908. Moreover, the anoxaemia is, for the reasons already given, not much relieved, and certain amounts of both anoxaemia and alkalosis remain.

* By anaemia is here meant deficiency in the percentage of haemoglobin in the blood. This is often associated with a great increase in the volume of the blood, as Lorrain Smith showed.

† Campbell, Douglas, Haldane, and Hobson, *Journ. of Physiol.*, xlvi., p. 316, 1914.

"ALKALOSIS."

For the existence of the anoxaemia we have other evidence, to which I shall refer presently; but what direct evidence have we for the alkalosis? Clear physiological evidence has been furnished in the course of a quite recent investigation by Dr. Kellas, Dr. Kennaway, and myself (at present in course of publication) on the effects of very low atmospheric pressure in the steel chamber at the Lister Institute. Dr. Kennaway's analyses of the urine showed that the excretion of acid at once falls to a very low figure at the low atmospheric pressure, while the excretion of ammonia diminishes also, as Hasselbalch and Lindhard had, indeed, already found. These diminutions indicate that the blood is abnormally alkaline during the anoxaemia, and that the kidneys and liver are doing their best to redress the balance, just as they would under normal conditions. If the blood is the least bit too alkaline the kidneys excrete alkali; if it is the least bit too acid they excrete acid. Moreover, if the blood is the least bit too acid the liver produces ammonia instead of urea. Another reaction to too great acidity is that the breathing is increased, which washes out carbonic acid.

In this connexion I have to confess to joint responsibility for originating an erroneous interpretation. On first noticing in 1908 that, after experiments at low pressures in the steel chamber, the alveolar CO_2 pressure remained low for a time after the subject had returned to normal atmospheric pressure Boycott and I drew the not unnatural conclusion that owing to the anoxaemia lactic acid had been produced in the body, and remained in the blood for some time after the anoxaemia had ceased, and thus helped to stimulate the respiratory centre by producing an acidosis. Douglas and I had already found that after any severe muscular over-exertion there is a similar effect, which we attributed to lactic acid produced in the muscles during the over-exertion, the oxygen supply to them by the blood being totally insufficient to balance the enormously increased oxygen requirements. This interpretation was afterwards verified at Guy's Hospital by Ryffel, who made use of his now well known and very beautiful method for estimating lactic acid. But the acidosis of muscular overwork passed off much more quickly than that apparently produced by a pretty long exposure to moderate anoxaemia. The lactic acid was apparently oxidized rapidly, while the apparent acidosis of ordinary anoxaemia was very persistent.

In other respects also the lactic acid theory was unsatisfactory. In the report on the Pike's Peak expedition of 1911 we therefore put forward the conclusion that the acidosis of moderate anoxaemia is a compensatory phenomenon which tends to relieve the anoxaemia by producing increase of the breathing, and is due to a special response of the kidneys and liver, which, as already mentioned, normally regulate the alkalinity of the blood. Meanwhile, Ryffel found that no lactic acid to speak of was present in the blood or urine during exposures to moderate anoxaemia in a steel chamber, or even on the summit of Monte Rosa.

The hypothesis of a special adaptive reaction appears now to be quite unnecessary. The kidneys and liver are apparently reacting during anoxaemia in their normal manner to an alkalosis; and this alkalosis is produced by the increased breathing due to the anoxaemia. The apparent acidosis which develops during anoxaemia is thus not an acidosis in the sense of a shifting to the acid side of the normal physiological balance, but the partial compensation of an alkalosis; and this compensation, as it slowly progresses, makes it possible for the breathing to respond more and more fully to the stimulus ultimately due to anoxaemia, without the compensating disadvantages produced by alkalosis in the manner already described. From the same point of view we can now understand much better why CO_2 acts so effectively in staving off anoxaemia. This effect is not merely due to increase of the breathing. It is seen strikingly, for instance, in CO poisoning under conditions where mere increase of the breathing could give no relief to the anoxaemia.

TREATMENT OF THE (SUPPOSED) ACIDOSIS OF ANOXAEMIA.

At this point I should like to say that it seems to me a gross mistake to treat the supposed acidosis of anoxaemia due to gas poisoning, "shock," and other conditions by the administration of alkalis. The body is calling for both oxygen and acid. I should also like to enter my protest against the unintelligible physical chemistry and physiology of the common assumption that because the "alkaline reserve" of the blood is found to be diminished an acidosis is necessarily present.* The greater the anoxaemia, the greater is the permanent increase of breathing, and the greater also must be the alkalosis produced. At very low atmospheric pressures, for instance, the permanent increase in lung ventilation is quite noticeable subjectively.

"PERIODIC" BREATHING.

I must now refer to another respiratory phenomenon shown by many, but not all, persons as a response to anoxaemia. The breathing becomes, or is very apt to become, periodic, as in ordinary clinical Cheyne-Stokes breathing. A relation between Cheyne-Stokes breathing and anoxaemia was first discovered in the wards of Guy's Hospital by Pembrey and Allen in 1905.† They showed that Cheyne-Stokes breathing could be abolished by giving oxygen, as well as by adding CO_2 to the inspired air, or diminishing its oxygen percentage. Douglas and I then found that periodic breathing is easily produced in normal persons after forced breathing or in other ways. We also showed that its production depends upon the fact that when want of oxygen acts on the breathing, the action and cessation of the stimulus occur much more sharply than when CO_2 is the stimulus. Thus the respiratory governor becomes too sensitive, just like the governor of an engine when there is no fly-wheel or an insufficient load, and begins to "hunt," the oxygen supply to the centre becoming, when the anoxaemia is not too considerable, alternately so small as to cause urgent breathing, and so great as, in the absence of the CO_2 which has been washed out, to produce apnoea.

Periodic breathing is thus always a symptom of anoxaemia, and is most easily produced by moderate anoxaemia, as at a fairly high altitude. When the anoxaemia is great the breathing becomes regular again, since even during the hyperpnoea the breathing cannot relieve anoxaemia. It is also easy to see why CO_2 stops the periodicity. The reason why the periods tend to be shorter in healthy persons than in ordinary clinical Cheyne-Stokes breathing will appear later. We can understand why want of oxygen should act far more promptly than the increase of hydrogen-ion concentration through which CO_2 acts on the centre. The blood and body as a whole are full of "buffer substances" which make changes of hydrogen-ion concentration a comparatively slow matter; but for changes of oxygen concentration there are no corresponding buffer substances between the blood and the tissues. In this connexion I should like to make another recantation—of the suggestion, namely, that want of oxygen acts by causing liberation of lactic acid within the living substance of the respiratory centre and thereby producing a hydrogen-ion stimulus.

RESPONSE OF THE CIRCULATION TO ANOXAEMIA.

The response of the circulation to anoxaemia appears to be on the whole similar to the response of respiration; but we know so little as yet of the physiology, as distinguished from the physics, of the circulation, that I can say very little definitely on the subject.

When anoxaemia is rapidly produced there is at first a marked increase of pulse rate and some increase of blood pressure; but, as in the case of respiration, this increase soon moderates, though the pulse rate remains above normal, and the more the greater the anoxaemia. The causes acting on the circulation seem to be, in the main, similar to those acting on the respiration, though they are less easily accessible to accurate observation and measurement.

The colour of the lips, tongue, and face gives us some indication of the degree of anoxaemia. If anoxaemia is produced rapidly, or produced in such a way that CO_2 is not removed in excess from the blood, there is a blue flush of the lips and face—the typical "blue" cyanosis. If, on the other hand, the anoxaemia is produced gradually and in such a way that CO_2 is removed in excess from the

* Some very important experiments published a year ago by Yandell Henderson and Haggard illustrate in a striking manner the fallacy of this assumption, as I recently pointed out in a short article on acidosis in *Nature*, May, 1st, 1919.

† *Journ. of Physiol.*, xxxii, Proc. Physiol. Soc. p. xviii, 1905.

blood the cyanosis is usually less evident, and of a duller colour, tending if the anoxaemia is very extreme to a leaden colour. Nevertheless, among different individuals there is marked variation in the relation of the colour to the general symptoms. In myself, for instance, the general symptoms are very marked by the time that the lips show distinct blueness, whereas in some other persons there is more blueness with only very slight general symptoms. In others, again, both the blueness and the general symptoms are more marked than in myself when the same air is breathed in a steel chamber at a low pressure. The shifting of the dissociation curve of oxyhaemoglobin will explain the fact that a man may be suffering considerably from anoxaemia although his lips are of a fairly good colour. To explain the differences in different individuals it would probably be necessary to know more than we yet do about how the circulation regulates itself in different persons in response to anoxaemia and alkalosis.

Effects of Anoxaemia on the Nervous System.

The effects of anoxaemia on the nervous system are characteristic. A rapidly produced anoxaemia causes, of course, temporary disturbance; but when the onset is gradual there is little or no discomfort, and for this reason anoxaemia is an insidious and therefore dangerous condition, as is well seen in CO poisoning or in ascents to very high altitudes in aeroplanes or balloons. The senses become dulled without persons being aware of it, and if the anoxaemia is suddenly relieved by administration of oxygen or other means the correspondingly sudden increase in powers of vision and hearing is an intense surprise. Powers of memory are greatly affected, and are finally almost annulled, so that persons who have never lost consciousness can nevertheless remember nothing of what has happened. Powers of sane judgement are much impaired, and anoxaemic persons become subject to fixed ideas which afterwards appear to them quite irrational, and to unrestrained emotional outbursts. I could occupy a whole lecture with anecdotes of the vagaries of my own friends and acquaintances, and myself, under the influence of anoxaemia.

Acclimatization to Anoxaemia.

When a cause of anoxaemia is persistent there can be only one or other of two terminations. Either the person becomes adapted or acclimatized to a greater or less extent, or he becomes progressively worse. Let us first glance briefly at acclimatization. To one side of this I have in reality already alluded. The alkalosis of anoxaemia is gradually dealt with by the kidneys and liver; but several days are usually needed for this, and quite clearly the process can never result in a complete restoration to the previous normal; otherwise there would be no stimulus to the maintenance of the new condition. When, however, the alkalosis has been sufficiently diminished it has also become possible so to increase the breathing that the oxygen saturation of the blood, otherwise imperfect, can be largely increased without compensating ill effects from shifting of the dissociation curve of oxyhaemoglobin. In a precisely similar manner the alkalosis and correspondingly increased anoxaemia would be more or less compensated in a case where the anoxaemia was due to a lasting deficiency in the circulation, or to a rapid diminution in the proportion of available haemoglobin, though in the former case the blood in the systemic capillaries would remain abnormally blue. There would seem here to be an indication for the administration of acid in suitable form and amount, with a view to hastening the adaptation.

The second side of adaptation consists in an increase in the facility with which the alveolar epithelium responds to the stimuli which originate in anoxaemia of the tissues. It responds by active secretion of oxygen inwards. I know that many physiologists still remain sceptical as to oxygen secretion in the lungs, and I shall not attempt in this lecture to go into the subject fully. It seems to me, however, that the direct quantitative evidence in favour of oxygen secretion is absolutely unshaken, while the indirect evidence is now practically overwhelming. But I hope to have another opportunity before long of examining this old controversy in the light of the new evidence.

The third side of adaptation is an increase in the percentage of haemoglobin. This is well seen at high altitudes and in chronic—particularly congenital—heart disorder. With the increased charge of combined oxygen in the blood the rate of fall in the diffusion pressure of free oxygen in the capillaries is, of course, diminished, and in this way anoxaemia is mitigated. Whether the tissues of a warm-blooded animal can adapt themselves to live with a lower diffusion pressure of oxygen than usual is an interesting question on which we have as yet no clear evidence.

The adaptive responses to anoxaemia have hitherto been studied only in connexion with acclimatization to high altitudes, but I am convinced that they are of great significance in practical medicine. It is particularly important to realize that they require time, and that measures which afford a patient the requisite time may save his life.

Imperfect Adjustment: Mountain Sickness.

Let us now look at the other mode of termination. Whenever a comparatively slight anoxaemia, such as that produced when a person not in good physical training goes to a height of about 10,000 ft., or stays in air containing more than about 0.02 per cent. of CO, is continued for several hours, the common result is nausea, headache, and general depression. This "mountain sickness" may only come on after the anoxaemia has ceased, but is unmistakable evidence of temporary damage, however slight, affecting the nervous system. Different persons are susceptible in very different degrees to mountain sickness. The usual ending of mountain sickness is that acclimatization gets the upper hand and complete recovery ensues; but sometimes the fight is long, or even dangerous.

Failure of Adjustment: Progressive Damage to Tissues.

When the anoxaemia is more severe, the evidence of progressive damage becomes more and more marked, so that even when the cause of anoxaemia is completely removed grave symptoms may remain. Thus, in severe CO poisoning, when the patient has remained unconscious for several hours, it is always a matter of doubt whether recovery will take place, or how many days, weeks, or months it will require. The CO diffuses off comparatively quickly through the lungs as soon as the patient is in pure air; within two or three hours very little CO is left in the blood. But the damage has been done—damage in the central nervous system, and very probably also in the heart and various other organs. It is often only by the most careful nursing and attention to every symptom indicating nervous and other forms of breakdown in different directions that such a patient can be saved.

Importance of Active Treatment.

I shall not attempt to describe or analyse in detail the general picture of the progressive damage from serious and prolonged anoxaemia; but I wish to emphasize very strongly the existence of this damage, and the consequent need for cutting anoxaemia short or preventing it if this is at all possible. Perhaps no cases have presented a more impressive picture of the dangers of anoxaemia and the advantages of preventing it than the cases of poisoning by lung-irritant gas during the war.

The Breakdown of the Respiratory Centre.

To one all-important aspect of the general breakdown during anoxaemia I should like to direct special attention. This is the breakdown of the respiratory centre. A forthcoming paper by Davis, Priestley, and myself deals fully with this subject, and it was also partially dealt with by Meakins, Priestley, and myself in a paper which has just appeared in the *Journal of Physiology*. The whole of this work was undertaken under the auspices of the Medical Research Committee. The result on which we lay emphasis is that when anoxaemia exists the centre very readily shows signs of the same sort of exhaustion as is caused by excessive resistance to breathing. That is to say, the breathing becomes progressively shallower and more frequent, just as happens so commonly in a dying man.

Now it has been generally assumed—by myself among others—that so long as a sufficient total quantity of air reaches the lung alveoli it does not much matter in itself whether the breathing is deep and slow, or shallow and frequent. A study of cases of chronic neurasthenia, and

particularly those caused by irritant gas poisoning, led Meakins, Priestley, and myself, however, to note that not only were there symptoms of anoxaemia in many of them, but that the breathing, particularly on exertion, was abnormally frequent and shallow. We then investigated the effects of shallow breathing in normal persons, with the help of the apparatus described and figured by Meakins, Priestley, and myself, in the *Journal of Physiology*, 1919, lii, p. 433. The result was that we could easily produce periodic breathing and other symptoms of anoxaemia by so limiting the depth of the breaths that rapid shallow breathing had to be substituted for normal breathing. Moreover, the periodic breathing was in comparatively long and stately periods, just like ordinary clinical Cheyne-Stokes breathing. Yet when samples of alveolar air were taken in the ordinary way the oxygen percentage was somewhat above normal.

The Fan-like Expansion of the Lungs.

To cut a long story short, we were forced to the conclusion that the key to the anoxaemia was furnished by the fact, clearly formulated by Professor Arthur Keith ten years ago,* that in the living body the lungs do not expand evenly and simultaneously at all parts, but open out part by part, somewhat similarly to the opening of the leaves of a lady's fan. When the breathing is shallow only certain of the leaves open, so that only certain parts of the lungs are properly ventilated, though in these parts the ventilation is quite abnormally increased owing to the increased frequency of the breathing. Now this increased ventilation must wash out from the blood a correspondingly increased proportion of CO_2, but cannot put in any appreciably increased quantity of oxygen, since the haemoglobin would be already almost saturated with oxygen by normal breathing. On the other hand, in the parts of the lungs where the air is left more or less stagnant there will not be nearly enough oxygen to saturate the haemoglobin. The net result will be that the mixed arterial blood will be deficient in oxygen, but will not contain more than the normal proportion of CO_2. If the proportion of CO_2 were abormally high the breathing would immediately increase till the balance was at least redressed; and actually the balance will be more than redressed, since the anoxaemia produced by the deficiency in oxygen will itself stimulate the breathing to some extent.

Clinical Significance of Variations in Rate and Depth of Breathing.

This discovery has of course thrown an entirely new light in all directions on the physiology and pathology of breathing, and particularly on the clinical significance of variations in the rate and depth of breathing. It has also shown that administration of air enriched with oxygen, or even simply with CO_2, as recommended by Yandell Henderson, may be of essential service in a great variety of clinical conditions accompanied either by rapid and shallow breathing, or by breathing in which, owing to uneven resistances in the bronchi or other causes, the expansion of the lungs is uneven. For, clearly, it is only necessary to increase the oxygen percentage in the air, or the depth of breathing, in order to get sufficient oxygen into the badly ventilated alveoli; and we actually found that only a small addition of oxygen to the inspired air was needed in order to abolish the symptoms of anoxaemia in our experiments.

A Vicious Respiratory Circle.

To return to the exhausted respiratory centre in cases of anoxaemia: it is evident that when the breathing becomes shallow from this exhaustion a dangerous vicious circle tends to be produced, since the anoxaemia makes the breathing shallow though rapid, and the shallow breathing increases the anoxaemia. This is a vicious circle which leads straight towards death, and it now seems probable that one of the most common immediate causes of death is failure of the respiratory centre rather than of the heart. The heart must, of course, always fail in the end if the respiratory centre has failed; but in the case of the heart itself there does not seem to be so great and immediate a danger from a vicious circle.† Ordinary clinical Cheyne-Stokes breathing, with its stately rhythm owing to the shallow breathing, is usually a sign of advancing failure of the respiratory centre.

Other Causes of Partial Failure of the Respiratory Centre.

Partial failure of the respiratory centre, with consequent secondary anoxaemia, has of course many other causes besides primary anoxaemia. Among these causes are toxic substances circulating in the blood, anaesthetics and other poisons, or the various causes of which the effects on the nervous system are classified as fatigue, shock, or neurasthenia. But the vicious circle of anoxaemia is always there to some extent, and may easily become dangerous. In breaking or preventing this vicious circle there is evidently a very wide field for the administration of oxygen.

Importance of Breaking the Vicious Circle Early.

I wish also to emphasize the fact that the sooner the vicious circle is broken the more striking will be the immediate effects. With long-continued anoxaemia a patient's condition tends to become hopeless. One of the most important effects of prolonged or extreme anoxaemia is a temporary partial failure of the respiratory centre, so that oxygen or even artificial respiration may be required for many hours.

With the help of the apparatus already referred to we discovered the fact that restriction of the depth of breathing produces anoxaemia far more readily in the recumbent than the upright position. This explains the existence of the orthopnoea which is so prominent a symptom in many cardiac and respiratory cases. A patient with shallow breathing due to impaired vigour of the respiratory centre cannot lie down because the anoxaemia is at once increased by this, and he must therefore sit up in bed if he is breathing ordinary air.

The Value of Oxygen Inhalation.

The effects produced by temporary oxygen administration in some cases have been known for long. The observations on this subject by Pembrey in the wards of Guy's Hospital were particularly striking. As it is now evident, however, that oxygen administration has a far wider and more important field of application in practical medicine than was previously suspected I will refer shortly to methods of administering it. My own attention was directed to the subject by the practical difficulties, with existing methods, of giving oxygen continuously in cases of irritant gas poisoning. It was evidently necessary to cut down all waste, and simplify the mode of administration as far as possible. As regards waste, there seemed to be no necessity for the patient breathing pure oxygen; and in any case the continuous inhalation of pure oxygen was excluded, owing to the fact that even 80 per cent. oxygen was found by Lorrain Smith to produce fatal pneumonia within three or four days. It seemed evident that only as much oxygen ought to be added to the inspired air as would suffice to relieve the anoxaemia. It was also evident that if the oxygen was delivered to the patient in a continuous stream half would be wasted, as it would come to him during expiration.

Method of Administering Oxygen.

I therefore devised an apparatus so arranged that by a simple device the patient inspired through a face-piece the whole of the added oxygen, without waste during expiration, while the proportion of oxygen could easily be cut down or increased, according as was needful. The original form of this apparatus was described in the BRITISH MEDICAL JOURNAL, February 10th, 1917, p. 181, after it had already been supplied extensively to the army in France. Its use there for gas cases was initiated, and the best mode of managing it carefully investigated, by Lieut.-Colonel C. G. Douglas of Oxford. Other well known medical officers have also made very valuable

* Keith, *Further Advances in Physiology*, p. 182, 1909.

† Owing to the coincidence of anoxaemia with too high a venous pressure and consequent over-distension of the right side of the heart, the heart itself may enter a vicious circle. Even if the anoxaemia is not relieved this vicious circle can often be broken by free bleeding, the beneficial effects of which in many cases of irritant-gas poisoning were first pointed out by Irvine and Macaulay of Johannesburg.

observations on the effects of oxygen inhalation.* The results, particularly in gas cases, were very striking; but unfortunately at that time, as will be seen from my own paper of 1917, the symptoms and significance of a failing respiratory centre were still unknown, so that the wide applications of oxygen in a great variety of medical and surgical cases were not realized. The apparatus was afterwards simplified, with the immediate object of making it both easy to handle and available for front-line and stretcher work, including treatment of "shock" cases. The apparatus in its latest form can now be obtained from the makers, Messrs. Siebe, Gorman and Co., of London.

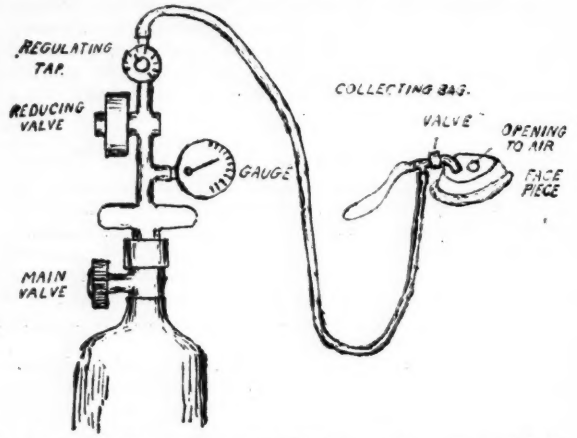

FIG. 3 shows the arrangement of this apparatus. It consists of (1) a pressure gauge showing how much oxygen is in the cylinder; (2) a reducing valve which reduces the pressure to a small amount which remains constant till the cylinder is exhausted; (3) a graduated tap indicating the flow of oxygen in litres per minute; (4) light thick-walled rubber tubing conveying the oxygen to the patient; (5) a small flexible collecting-bag connected with the face-piece through a non-return mica valve which prevents expired air from entering the bag; (6) a face-piece provided with elastic straps and a rubber pneumatic cushion which can be taken off for disinfection. The patient can inspire and expire freely through an opening in which there is a rubber flap to cause a very slight resistance. During expiration the oxygen collects in the bag, and is sucked into the face-piece at the beginning of inspiration. From the movements of the bag it can be seen at any moment whether the patient is receiving the oxygen. To put the apparatus in action the main valve is opened freely and the tap adjusted to give 2 litres a minute, or whatever greater or less amount suffices. With a delivery of 2 litres a minute a 40-foot cylinder would last nearly ten hours.

To make oxygen really available for ordinary medical work it is essential not only to prevent waste of oxygen but also to cut down as far as possible the weight of oxygen cylinders and the difficulties with stiff or leaky valves and other defects. A nurse must be able to handle the whole apparatus with ease and administer oxygen at once at any hour of the day or night. The question of cutting down the weight of cylinders to the minimum which is perfectly safe is now being investigated and reported on by a committee of the Department for Scientific and Industrial Research. The old regulations necessitating very heavy cylinders appear to be out of date in view of the great advances in steel manufacture. The Air Force succeeded in getting this problem practically solved for war purposes, so that an aeroplane could easily carry a large supply of oxygen; and the light cylinders adopted by the Army Medical Department for stretcher work are of this pattern. The improved patterns of valves and other fittings simplify greatly the handling of the apparatus.

TWO TYPES OF OXYGEN APPARATUS.

For both hospitals and ordinary medical practice it seems to me that two types of oxygen apparatus will be required—one for continuous administration with cylinders as large as a nurse can manage. The other will be a very light apparatus with no mask, to be used in sudden emergencies by simply letting the oxygen blow into the patient's mouth. From the little I have had the chance of seeing I feel pretty certain that failure of the respiratory centre often occurs with dramatic suddenness, usually in the night, and requires to be dealt with by administering oxygen without the slightest delay. We now know from experiment how quickly the vicious circle of respiratory failure may produce its effect in a normal healthy person. In a person whose respiratory centre is already weakened by the results of infection or other causes the failure may be far more rapid, and the recovery on giving oxygen equally rapid.

OXYGEN CHAMBERS.

An entirely different method of continuous oxygen administration was initiated last year at Cambridge by Mr. Barcroft and Dr. Hunt of Guy's Hospital, and has also been used recently at Stoke-on-Trent. The patient, together with his bed, is kept in an airtight chamber, the air of which is enriched to any desired extent with oxygen; this enriched air is purified and dried continuously by pumping it through suitable absorption vessels. The great advantage of this plan is that the patient is quite unhampered by a face-piece or tube, and can, if necessary, move about freely within the chamber. In this connexion it must also be remembered that in many cases the restorative effects of oxygen will only be very gradual. On the other hand the cost is heavy, and danger from fire has to be most carefully guarded against, for clothes, etc., will burn fiercely in the enriched air. It is also difficult to alter rapidly the percentage of oxygen according to the requirements of the patient.

I hope that chambers of this kind, with, perhaps, simplifications in detail, will be tried soon in a variety of cases. The results hitherto obtained in chronic gas cases, asthma, etc., seem to be most promising; but a great deal of further observation is evidently needed, and has, of course, been interrupted at Cambridge owing to closure of the Military Hospital there. I venture to hope that the whole matter will be actively taken up and carried further at Guy's Hospital, where Dr. Hunt's knowledge and experience would be invaluable. Along with the trials of oxygen there will, I hope, be trials of CO_2.

SOME OTHER USES OF OXYGEN.

On many points connected with the uses of oxygen I have been unable to touch—for instance, the use of oxygen with anaesthetics and for preventing or mitigating "shock" after operations. I have endeavoured, however, to place before you the main known physiological facts as to oxygen administration.

Although imperfect oxygenation of the arterial blood is a far more frequent primary or secondary cause of anoxaemia than was formerly suspected, there are, of course, other causes, as already mentioned. One of these is failure in the supply of blood to the right side of the heart, with consequent fall in arterial blood pressure. To what extent this condition may be secondary to defective oxygenation in the lungs is not as yet clear. In any case the failure in blood supply can be effectively combated by intravenous injection of gum saline solution, as recommended by Bayliss.† The experimental evidence which he has brought forward on this question seems to me conclusive.

Another of the causes that has been mentioned is a defective proportion of available haemoglobin in the blood. To combat this condition the most effective remedy may often be transfusion of blood, carried out with the necessary precautions; but another powerful remedy is the administration of pure, or nearly pure, oxygen. The object of giving the oxygen is to increase very greatly the amount of oxygen in simple physical solution in the arterial blood. As I showed many years ago, an animal can by this means be tided over the emergency while its haemoglobin is for the time thrown out of action by carbon monoxide or by one of the methaemoglobin-forming poisons; and anaemia from loss of blood could doubtless also be combated temporarily in a similar manner till adaptation had time to occur.

CONCLUSION.

In conclusion, let me say that it is cure and not mere temporary palliation of symptoms that should always be kept in view in connexion with the treatment of anoxaemia. The object of breaking the vicious circle of anoxaemia is to give the body time for adaptation or recovery.

Both the physicist and the physiologist or physician deal with "Nature" (*φύσις*). But it is with Nature as

* See *The Administration of Oxygen in Irritant Gas Poisoning.* Report No. X of the Chemical Warfare Committee. Issued by the Medical Research Committee, 1918. With full illustrations of apparatus and directions for use.

† Bayliss, *Intravenous Injection in Wound Shock*, 1913.

Democritus and Empedocles saw her that the physicist deals, while the physiologist and physician deal, or ought to deal, with that truer and deeper vision of her as she appeared to Hippocrates. On the practical side the physicist aims at guiding and controlling Nature, whereas the physician aims at helping her. The object of this lecture will have been attained if I have succeeded in indicating how we may help in one of her tight places that ever more marvellous "Nature" which the keen intellectual vision of Hippocrates first began to reveal definitely to the world.

WAR LESSONS AS APPLIED TO CIVIL PRACTICE.*

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IN the limited time at our disposal I propose to select a few subjects only which seem to me to have some bearing upon practice in civil life, and which suggest some modification of previous principles and methods of treatment.

Wound Treatment.

With regard to wounds, it will suffice to describe all gunshot wounds as potentially septic wounds. Potentially septic wounds are by no means uncommon in civil life also—for instance, abrased, contused, lacerated, incised, or punctured wounds received by workers on the soil, especially made soil containing manure, bicycle and motor accidents, and street accidents generally, where any of the above types of wounds may be contaminated by mud, dust, or dung, and are often complicated by fracture of bone; bites of animals, hunting accidents, and the like—all such wounds are potentially septic, and, in so far as they are potentially septic, they resemble the wounds of war, and should be treated on the same lines. If we do so treat them, our results should be better than under war conditions, because we can get at them soon, whereas during heavy fighting forty-eight hours, or even more, often elapsed before the casualty clearing station was reached by the wounded soldier.

During the four and a quarter years of actual fighting the treatment of wounds was revolutionized, and the results showed a marvellous improvement as time went on. The researches of the pathologists laid the foundation, upon which the surgeons built new methods, and we must briefly trace the more important of these in order that we may apply the lessons to be learnt from them.

In the early part of the war tetanus was alarmingly frequent. A large and constant supply of antitetanic serum was then organized, and for the last three years every wounded man received 750 units of serum at the dressing station and another 750 in seven days' time. As a result tetanus became rare, and such cases as were seen were of the modified or so-called local type. Now and again by some oversight a man did not get his injection—I saw such a case in France. He arrived late at night, three days after being wounded, at the base hospital, and there was no record on his field card of his having had an injection. He was given 1,500 units early the next morning; but acute tetanus began that evening, and ended fatally on the seventh day.

It is perfectly true that tetanus is a rare disease in this country, but when it does occur, it is so dangerous and so often fatal that we should, I think, as a routine practice always give an injection of serum as soon as possible after the infliction of wounds such as I have described above. And it is the duty of the sanitary authority or of the Government to provide us with this serum. This, however, is only a preliminary to the actual treatment of a potentially septic wound.

The facts in connexion with such a wound are these: On the one hand, the tissues have been laid open by some contaminating agent, the wound surfaces have not only been contused, injured, or in part devitalized by that agent, but they have had implanted on them a bacterial infection, whether *Bacillus tetani*, staphylococci, streptococci, gas-forming anaërobes, *Bacillus coli*, or what not. On the other hand, there is an exudate from the wound surface, consisting primarily of blood and blood serum.

The bacteria thus implanted require for their growth disorganized albumin, such as is afforded by devitalized tissues, and also the presence of trypsin, which trypsin is formed by the fermentative action of bacteria. If there has been much devitalized tissue, or if there has been much loss of blood, or shock, or there is general debility and malnutrition, the bacteria multiply rapidly and the wound quickly becomes septic. If, on the other hand, there is no devitalized tissue and the vascular supply is uninjured, it comes to be a direct conflict or trial of strength between the invading bacteria and the natural defences of the body fluids.

The weapons of the invading bacteria are three: (1) Their proteolytic action or power of disorganizing the body albumin; (2) their power of producing trypsin by their fermentative action; (3) their power of producing toxins.

The natural defences of the body are in the main two: (1) The antitryptic power of the blood serum; (2) the phagocytic action of the living cells.

So that if the antitryptic action of the blood serum is able to keep pace with and to neutralize the trypsin formed by the bacteria, and the phagocytic action of the body cells is able to destroy them, repair sets in without suppuration—and this, indeed, is what usually takes place in wounds of the face, owing to the free vascularity of the tissues. The defence therefore has the advantage in wounds of the face. If, on the other hand, the trypsin and broken-down albumins increase and leucocytes are killed by the toxins the defence is beaten. There is suppuration and all the local signs of acute sepsis, with unknown dangers ahead in the shape of toxaemia, septicaemia, secondary haemorrhage, and the like. The vital reaction has failed and the invader has conquered.

To put the case briefly, except in the case of wounds in the face, it may be said to be "a toss up" in potentially septic wounds as to which will win, the invaders or the defence. I submit that the war has taught us how to help the defence so that in the majority of cases it wins, and I further suggest that in civil practice we should adopt the methods which have been so successful in war. To acquiesce in it being "a toss up" is no longer either prudent or justifiable.

The problem, therefore, is how best to aid the defence in the case of a wound which is contaminated, the walls of which are possibly in part devitalized, and which forms, therefore, a very favourable soil for the growth of bacteria.

Since Colonel Sir H. M. W. Gray published his paper on excision of gunshot wounds, in the *Journal of the R.A.M.C.*, vol. xxvi, in 1916, it has been universally acknowledged that excision is the best prophylactic method of avoiding suppuration; it has been recognized, further, that the sooner a wound is excised after the receipt of the injury the more certainly is infection avoided. By excision we remove entirely, or aim at removing entirely, the wound surfaces which are sown with bacteria, as well as all devitalized tissue and shreds which are cut off from their blood supply, leaving a clean wound relatively free from contamination and capable of healthy reaction.

The procedure, in superficial wounds which do not extend beyond the deep fascia, is comparatively simple.

The skin is shaved and swabbed with iodine, or a 5 per cent. solution of picric acid in spirit, and the tissues infiltrated with novocain and adrenalin. The wound itself is then wiped out with a swab soaked in either iodine or the picric acid solution, and dried; the ends of it are clipped up with Lane's or other forceps so as to put the tissues on the stretch, and with a sharp scalpel the wound is excised completely at a distance of one-third to half an inch from the wound surface. Care is taken to prevent the clean new surface from being touched or contaminated by the original wound surface.

In deep wounds total excision may be anatomically impossible, but the skin and more superficial parts can be excised, and injured muscle removed, loose bone fragments picked out, and a careful toilet of the wound made under a general anaesthetic.

If immediate primary suture is not employed—and in the majority of cases this is too risky—the wound is packed with gauze well soaked in flavine; then in forty-eight hours, if the bacteriological findings are favourable, the wound is sutured carefully so as to bring all surfaces into contact and leave no cavities. This is called delayed primary suture.

There are two classes of wounds where primary or immediate suture has been found to be advisable—namely, in wounds of the scalp, and wounds of the knee-joint. In scalp wounds primary suture after excision is employed in order to attain immediate aseptic union, so as to give an aseptic field for any subsequent operation if such should

* Address delivered at annual meeting of Branch, June 26th, 1919.

be necessary owing to fracture or symptoms of compression. In wounds of the knee-joint the wound is excised down to the capsule and sutured, with or without previous flushing of the joint cavity with normal hot saline. In all other wounds, except those of the face, excision and delayed primary suture has been found to be the safest and best course. I submit statistics of 150 consecutive cases of delayed primary suture which were performed in May, June, and July, 1918, at a base hospital in France, which will give you some idea of the proportion of successes to failures, and the bearing of bacteriological findings on results. You will note that suture was employed in eleven cases of compound fracture, and that with one exception they all healed *per primam*. As to the other 139 cases you will see that failure was rare, that the minor bacteriological risks were a few colonies of skin cocci, and that the major risks were streptococci, or massive infections by *Staphylococcus aureus*.

I may say that these cases were the work of several different surgeons, being all the cases of suture from the different surgical wards; and I suggest to you that they afford evidence of the desirability of treating all potentially septic wounds in civil practice, except wounds of the face, by excision and primary or delayed primary suture.

Delayed Primary Suture.

No. of cases, 150.

Superficial, 35. All healed p.p. Sterile, 19; cultures, 7; no report, 9. Cultures, *Staphylococcus aureus* or *albus*.

Deep, 115—
(*a*) Healed p.p., 97 (complete suture 82; partial suture 15).
(*b*) Failures, 18 (complete failure 13; partial 5).

Of 82 complete sutures—successes:
3 Major risks (2 profuse *Staph. aureus*; 1 *B. coli*).
15 Minor risks (*Staph. aureus* or *albus*).
39 Sterile.
25 No report.

Of 15 partial sutures—successes:
3 Major risks (2 streptococci; 1 profuse *Staph. aureus*).
0 Minor risk.
8 Sterile.
4 No report.

Of 13 complete failures:
4 Major risks (1 streptococcus—amputation of arm; 2 massive *Staph. aureus*; 1 multiple mixed infection).
2 Minor risks.
3 Sterile.
4 No report.

Of 5 partial failures:
3 Major risks (all abundant *Staph. aureus*).
1 Minor risk.
0 Sterile.
1 No report.

Compound fractures sutured, 11:

Humerus (sterile; p.p.)	2
Clavicle (sterile; p.p.)	1
Radius (sterile; p.p.)	3
Ulna (sterile; p.p.)	1
Ulna and radius (few *Staph. aureus*; p.p.) ...	1
Tibia and fibula (sterile; p.p.)	1
Os calcis (sterile; p.p.)	1
Metacarpal (*Staph. aureus*; healed with superficial suppuration)...	1
	11

I well remember some years ago a case of a young lady whose right shoulder-joint was dislocated by a motor accident, and there was a contused laceration just below the insertion of the deltoid muscle where the arm which she had stretched out as the landaulette fell sideways against the bank became squeezed between the frame of the door and the ground. The wound extended through the deep fascia although its entrance was small, and when I first saw her three days afterwards the wound was very septic. High fever, abscess, tracking pus involving the shoulder-joint, profuse secondary haemorrhage, amputation, septicaemia, and death, all followed with tragic and uncontrolled rapidity.

I am convinced that with the knowledge we now possess this life would have been saved by immediate excision of the wound, and delayed primary suture.

Antiseptics.

The war has also revolutionized our ideas about antiseptics. When a wound is really septic, and the colonies of bacteria have penetrated deeply into the tissues of the wound, no antiseptic quâ antiseptic is of any avail. But when a wound is fresh, and has been excised wholly or in part, and is awaiting early suture, a suitable antiseptic is of value. For in this case we may imagine that there are a few bacteria scattered superficially over the wound surface. The question is what is a suitable antiseptic?

The ideal antiseptic should have certain qualities.

1. It should be a powerful germicide in the presence of blood serum.
2. It should be non-poisonous.
3. It should not hinder or destroy the antitryptic power of the blood serum.
4. It should not injure the phagocytes or hinder phagocytosis.

The antiseptics upon which we relied in pre-war times have been found to fail notably in one or other of these qualities—for example, carbolic acid inhibits leucocytosis in a lower concentration than that required to kill organisms. Again, mercuric chloride is a very powerful germicide *in vitro*, but it loses much of its power in the presence of serum, and it not only inhibits leucocytosis but is poisonous.

Browning and his fellow workers investigated the relative values of various antiseptics, old and new, and deduced what they called a therapeutic coefficient for each, which they arrived at by a certain ratio. The ratio being—

$$\frac{\text{Concentration which reduces phagocytosis by 50 per cent.}}{\text{Lethal concentration in serum.}}$$

Take, for instance, carbolic acid against the coccal and *Bacillus coli* groups respectively.

	Cocci.		B. coli.	
Carbolic acid ...	$\frac{1:500}{1:250} = 0.5$	...	$\frac{1:500}{1:500} = 1$	

So that the therapeutic coefficient of carbolic acid is said to be 0.5 and 1 respectively in regard to these two groups. Similarly the coefficients of mercury perchloride and the hypochlorites are also a little under or a little over unity. Brilliant green has a coefficient of 15 against the coccal group but drops to 1.7 against the *Bacillus coli*. Flavine, on the other hand, has a large therapeutic coefficient of 400 against the coccal group and 200 against the *Bacillus coli* group.

We see, therefore, that flavine is by far the most efficient antiseptic which we possess—its peculiar quality being that it is very powerful in high dilution against both the coccal and *B. coli* group, and that its power is greatly enhanced in the presence of serum. The hypochlorites, eusol, Dakin's solution, and the like, have a low therapeutic coefficient, but they possess the useful quality of destroying trypsin. They are, however, soon decomposed by contact with the wound secretions and continuous renewal by some irrigation method is necessary for their efficient action. This, therefore, rather limits their usefulness, except in hospitals. A solution of flavine in normal or hypertonic saline 1 in 1,000 or 1 in 2,000 is by far the safest and best antiseptic with which to dress our freshly excised wound preparatory to suturing it. Gauze saturated in this solution is lightly packed into the wound and kept moist by adding flavine to it from time to time. In the case of a hopelessly septic wound antiseptics are of little or no avail. Besides the well known boracic fomentation, which encourages vascularity, I would draw attention to two dressings of value—namely, the salt pack, and the bismuth, iodoform and paraffin paste. The former has been shown by Sir Almroth Wright to produce a copious flow of lymph, and so facilitates the reaction of the tissues against the invading bacteria. The latter, Professor Rutherford Morison's device, acts we know not how, but it stimulates the tissues to form granulations rapidly. The wound should be dried out with methylated spirit before the paste is rubbed in. This dressing does not need daily renewal; it is merely necessary to add more gauze soaked in spirit if the discharges come through the dressing.

Transfusion.

Transfusion for haemorrhage and shock is another subject for our consideration. There can be no doubt that the transfusion of human blood is the ideal method—but this necessitates the presence of a suitable donor or at any rate a store of citrated blood; it is therefore not suitable for ordinary practice.

The effect of the usual transfusion of normal saline has been found to be transitory in cases of haemorrhage and shock, owing to the rapidity with which the fluid transudes through the capillary walls by diffusion into the perivascular tissues. But if the saline is thickened by adding gum arabic in the proportion of 0.9 per cent., the tendency to transude is greatly diminished, and the beneficial effects of the transfusion are much more lasting. So far as my experience goes, the addition of the gum is a

great advance in the treatment of all cases of haemorrhage combined with shock. The solution can be easily made and sterilized and stored in suitable glass bottles.

The Value of Team Work.

The last lesson from the war to which I should like to draw attention is the extreme value of what I can only call team work in research, diagnosis, and treatment; and I think that perhaps this is the most important of all the lessons which the war has to teach us, and not only us as a profession but the Government, or rather the Ministry of Health, also. Consider for a moment the disadvantages under which we at present labour. We are the victims of a half-fledged, inadequate piece of legislation which is founded apparently upon the supposition that disease can be dealt with effectually by giving bottles of medicine or liniment to the sick, or that if this fails and the sick get worse they can be sent to one of the overcrowded voluntary hospitals with which the Legislature has nothing whatever to do. Anything more unsatisfactory to the sick, or demoralizing to us as a profession, it is hard to imagine.

I should like to bring to your notice an able and altogether admirable letter in the *Lancet* of June 14th last, by Dr. Flemming of Bradford-on-Avon, entitled "The general practitioner's hospital," in which he puts his finger on the crying need of the present day, namely, the establishment of an adequate number of what might be called auxiliary hospitals throughout the country, staffed by teams of general practitioners, to which all practitioners can have access, and to which they can send cases requiring clinical observation of any kind, rest, or treatment which cannot be carried out in the sick person's home. The present general and special hospitals would still be amply filled by cases of severity or difficulty, but they are essentially and always will be the hospitals of the specialist and consultant, and should be reserved as such. He demonstrates that no medical service insurance scheme can be efficient without such provision—provision to enable the general practitioner to diagnose, observe, and treat his cases adequately and to the satisfaction of himself as well as of the sick.

War has shown the extreme advantage of men in this way working together, not in rivalry but for a common end, helping to solve knotty problems, picking each other's brains, and not only gaining valuable knowledge, but conferring untold benefits upon those under their care.

That which is new and up to date to-day is old and obsolete to-morrow, and it is only by some such means as Dr. Flemming has described that we can keep our heads above water, maintain our interest in our work and our cordial co-operation with each other. Let us insist, then, that this is our due, that we should be given opportunity to meet and work together for the common good more often than is ever now possible, so that it may be less hard to maintain our self-respect and our pride in a profession which at the best is most arduous, which, speaking generally, is inadequately paid, and which makes a very great demand on the qualities of unselfishness and self-sacrifice.

The outlook for our future is surely encouraging. The nation and the Government know full well that they owe a great debt to the medical practitioners of this country and of the empire; without them war on a large scale would have been impossible, and the record of their work and its results will for all time be a reminder of how large a part is played by our profession in the welfare, prosperity, and happiness of all. Moreover, there is, and will be in the future, a department of State and a responsible Minister with whom we can deal.

No doubt the aftermath of war will bring us anxieties—these are universal; we must, however, possess our souls in patience, and remember Bacon's dictum that the greatest innovator is time. Do not let us be in a hurry, but study to preserve that unity which is the only sure measure of success.

PROFESSOR A. HOPEWELL-SMITH has received the honorary degree of D.Sc. from the University of Pennsylvania.

AT the recent elections in Germany only one member of the medical profession, Dr. Hartmann, was returned to the National Assembly. Three physicians, Drs. Abderhalden of Halle, Schlossmann of Düsseldorf, and Struve of Keil, were elected to the Prussian Assembly.

NOTE ON RE-AMPUTATION.

BY

A. E. CHISHOLM, F.R.C.S.EDIN.,

LATE CAPTAIN R.A.M.C.,

EDINBURGH.

UNFORTUNATELY a primary amputation frequently fails to yield a satisfactory result. One main cause is, no doubt, that the circumstances under which the first amputations were done did not tend towards good healing. Patients brought to the casualty clearing stations were often in a low condition, and infection was always present. In many cases the amputation was performed above the zone of infection, but this was not always a reasonably correct procedure. Very often the wound was wisely left open and packed. The resulting delayed union tended towards cicatrization and contraction, and the scar was apt to become adherent to the end of the bone. Should sepsis develop, the result must often be imperfect healing with possibly sequestrum formation and sinuses.

Some Reasons for Re-amputation.

1. Adherent scar with weak or partial healing. If the scar is terminal, and especially if adherent to bone, it is apt to become irritated by pressure of the artificial limb. If lateral and adherent to the bone near its end, there is apt to be trouble from dragging. Such scars may break down. "A large or a small adherent scar is not necessarily an indication for re-amputation. Many cases with an adherent thin scar do well—in fact, far better than they would do with a better scar and a shorter stump. It is when the stump is conical and has a large terminal scar or ulcer that a re-amputation may become necessary" (Huggins).

2. A chronic granulating surface, especially if terminal and near the end of the bone, is very likely to lead to weak and unsatisfactory healing with adhesion to the end of the bone, or healing may fail altogether.

3. The presence of sinuses. Huggins says: "No aseptic operation should be performed on a stump until all sinuses have been healed for two or three months." I hesitate to express an opinion contrary to one with so large an experience, but I think that at least in cases with very mild sepsis in the sinuses, much time may be saved and a good result obtained by re-amputation, provided certain precautions are observed.

4. Sequestra. It is usually wiser to re-amputate than to be content with removal of the terminal sequestrum; time will thus be saved as the separation of the sequestrum need not be waited for, and if removal of the sequestrum alone be performed, the resulting end of the bone is likely to be irregular and ill adapted for weight bearing. Further, the sinus leading to the site from which the sequestrum has been removed will be somewhat septic, in many cases terminal or nearly so, and will tend to heal rather slowly with an inclination to form a cicatrix firmly fixed to the bone.

Although sequestrectomy, in the lower limb at least, should rarely be considered a final operation, it is a very sound procedure when active sepsis is present, and when it would be unjustifiable to re-amputate. The sequestrum may be removed and the track cleaned and the wound left open. When the sepsis has abated the radical operation may be performed. In the upper limb, where end bearing is not required, sequestrectomy may be found sufficient.

Prevention of Haemorrhage.

It is rarely, if ever, necessary to employ a tourniquet in re-amputating. If the main vessel be properly controlled by digital pressure, very little blood should be lost. There is good evidence that there is not only an immediate reactionary hyperaemia when the tourniquet is removed, but that there is a greater liability for reactionary bleeding to take place several hours later if a tourniquet has been used than if digital pressure has been employed alone. The main vessels should be cut through late and clamped early. It is well to superimpose the fingers of the two hands in controlling the femoral artery, so that alternate relief may be given without changing position.

In amputating through the thigh without a tourniquet some slight haemorrhage may take place from the uncontrolled terminals of the obturator and sciatic arteries, but these can be quickly clamped.

In operating below the knee pressure on the femoral artery in the groin, if properly applied, should satisfactorily control bleeding. It is more difficult to find the main vessels in this region than in the thigh, because of their proximity to the bones and because of the tendency to retract, but the difficulty is not great. In the upper limb there should be no difficulty in obtaining a good purchase over the brachial artery digitally. It is common to find a good deal of firm fibrous tissue extending for some distance up the line of the greater vessels. This causes so great a diminution of the lumen that no digital pressure may be required at all, but it is wise for someone to be ready to apply it in case of need.

The Operation.

I have found the following points of practical value in re-amputating:

1. Avoid a terminal scar. It is usually easy to achieve this in the thigh, but it is otherwise in the leg, if amputation has previously been performed fairly high up. Sometimes, owing to lack of skin, it is not possible to avoid a terminal scar and yet retain enough bone for the fitting of the artificial limb. The scar must take its chance, so as to preserve the joint, in such a case. But troublesome adherence may be avoided by guarding against infection, and also, possibly, by including a thin layer of muscle in the flaps; a retention suture left in for a few days will tend to prevent the scar from adhering in the wrong way to the bone; the retention suture should be guarded with rubber tubing to prevent it from cutting into the skin.

2. It is rarely necessary, and probably rarely wise, to include muscle in the flaps. A good fibrous pad is formed between the skin with its integuments and the sawn end of bone.

3. Re-amputate clear of the disability for which re-amputation is being performed, and try to make sure that no further operation will be necessary. The object of re-amputation is to get a good sound serviceable stump. It is far better to sacrifice a little extra bone, provided it can be spared, as it usually can, than to risk a poor result with the possibility of yet another re-amputation having to be performed some weeks or months later, just because the operation has been too close to or within the danger zone. Therefore the flaps should be cut clear of the scar unless there is some real reason in a special case against such a procedure. The scar especially should be avoided if there is the slightest suspicion of sepsis.

It would appear that pathogenic micro-organisms may lie latent in scar tissue for considerable periods. According to Huggins, the clinical evidence that a stump is ready for re-amputation is the disappearance of oedema from the skin and deep structures. It may be necessary to cut through and often include in the flaps the deeper scar tissue and sometimes lateral scars, but the scar in relation to the end of the bone should be avoided.

For the thigh I have usually employed antero-posterior flaps, the anterior one being the larger and forming the pad for the newly sawn bone end. Rarely if ever is it good treatment to dissect the adherent scar off the bone end, undercut the skin, and suture, leaving the bone intact. Even if the end of the bone be healthy, such a scar is likely to be terminal and to re-adhere, thus reproducing the former disability.

4. In dealing with terminal sequestra a difference must be made between those cases in which there is little or no active sepsis present and those in which sepsis is pronounced.

5. Re-amputation should not be performed in presence of a really actively septic wound. Healthy granulation is not a contraindication, but a really septic granulation surface should be considered a danger signal. The folly of hastening matters in such cases has been proved. The new wound, in spite of the greatest care during operation, is very likely to become septic, the lymphatics presumably being loaded with micro-organisms. The patient may develop general toxaemic symptoms, and the wound will in all probability break down. In many such cases another re-amputation will be necessary at a much later date. Thus time will be lost, an unnecessarily short stump will result, and health will be at least temporarily impaired. In operating on cases where healthy terminal granulation existed, I have been in the habit of swabbing it with pure carbolic, and then covering it over with gauze clipped on to the skin before starting to cut the flaps.

6. If the wound fills up with clot—for example, after a reactionary haemorrhage—it is well to open it right up under a general anaesthetic, clear out the clot, re-suture, and drain in the usual way. Otherwise there will be great risk of a septic state ensuing.

7. If skin is scanty, and if it is important to preserve the length of the stump with a view to future function and fitting, extension may be applied by means of glue or strapping stretching from the stump to some form of wire splint. This may be in use for days or even for weeks, prior to operation, and a considerable gain may be achieved.

8. In amputation a short distance below the knee it is well to apply a posterior splint before the patient comes out of the anaesthetic, for there is a great tendency for the knee to assume the flexed attitude of rest, and, if convalescence be delayed, a certain amount of contracture of the hamstrings, often difficult to overcome, may take place.

9. If sepsis appears in a mild form after operation, fomentations or Carrel's treatment may be applied for a few days.

10. If re-amputation has to be performed in presence of a sinus only very mildly septic, or if the muscles do not look very healthy on section, a flavine pack will be found of value, the wound being left open with a view to delayed primary or secondary suture later. Or bipp may be applied, suturing the wound and providing drainage for serous oozing for a few days.

11. In amputations below the knee the anterior edge of the tibia should be bevelled so as to prevent the sharp edge from pressing on the anterior flap. It is important also to divide the fibula about a quarter of an inch higher up than the tibia, otherwise fitting of the artificial limb will be interfered with. According to Huggins it is important to preserve the interosseous membrane so as to prevent outward displacement of the fibula.

12. My usual routine, before suture of the wound, has been to swab the fresh raw surface with ether, which, besides acting as an antiseptic, tends to encourage bleeding, so that small vessels which might lead to troublesome bleeding later on can be ligatured at the time of operation. Ether tends also to show up unhealthy muscle by the fact that it may not react so well to the stimulus. This especially applies to avascularized damaged muscle seen soon after the infliction of the primary wound. The wound is then closed and sutured accurately. A narrow rubber dam is introduced at each end of the wound. These drains are left in for two or three days and then removed provided no sign of infection has appeared. A thin rubber dam provides very efficient drainage and is much to be preferred to tubing in most cases.

In my series of cases the average time of operating since the last amputation has been about six months, ranging from two to thirteen months. No doubt time is an important factor from the point of view of latent sepsis, but my experience tends to show that the clinical condition of the stump is of even more importance.

It cannot by any means be claimed that all wounds heal up by first intention. But if these rules are adhered to there will be few, if any, failures. Many cases will heal right away. Some will show a mild reaction which will soon subside.

ACCIDENTAL TRANSFERENCE OF THE MALARIAL PARASITE IN THE COURSE OF TRANSFUSION.

By ALFRED S. GUBB, M.D.,

SURGEON TO AUXILIARY HOSPITAL No. 102, ALGIERS.

THE following notes seem to point to the transference of the malarial parasite in the course of the operation of transfusion of blood, and as instances of such accidental contamination appear to be extremely rare—in fact, I know of no other example—I have thought it worth while to place the case on record:

A soldier back from Salonica arrived in Algiers in November, 1918. While in Salonica he had suffered a good deal from a pernicious form of malaria, and when sent into Hospital No. 102 he was profoundly anaemic, his blood only containing some 2,220,000 red corpuscles per cubic millimetre. At first he appeared to be gaining ground; he was cheerful, his appetite was good, and there was no fever.

Ten days after admission he suddenly became feverish, the temperature running up to 40.4° C., with headache and marked vertigo. This did not yield to doses of 2 grams of quinine a day and injections of hectine. The report on his blood stated that it contained *Plasmodium praecox*, with numerous young forms and nucleated red corpuscles. The anaemia became still more intense, and on December 13th he became semicomatose. It was then decided to perform transfusion as a last resource.

One of the sisters was good enough to place her services at our disposal, and transfusion was carried out on December 14th by the aid of Jeanbrau's apparatus. The operation was performed by a *confrère* who had had considerable experience of this apparatus. After duly sterilizing his hands and putting on sterile gloves, he began by exposing the median cephalic vein in the sister's arm, and when this had been accomplished he did the same for the patient who had been placed in close proximity. Everything being ready, he opened the donor's vein, aspirating the blood into the recipient *ad hoc*, and infusing it in due course into the patient's vein. The operation having been carried to a successful conclusion, it only remained for him to suture the incisions in donor and patient.

On December 29th the sister was seized with a violent rigor, accompanied by general aching and pain in the limbs. Her temperature rose to 40.2° C. As we were in the midst of an epidemic of influenza she was naturally thought to be suffering from an attack of the prevailing malady, but a few days later the periodicity of the attacks of fever suggested the possibility of malaria, and examination of the blood revealed the existence of *Plasmodium praecox*. She remained in a precarious state for several weeks, but eventually improved under combined quinine and arsenical treatment.

It is to be noted that the sister had never suffered from malaria, and was to all appearances in excellent health at the date of the transfusion. For that matter it was not the season for malarial attacks to develop; moreover, the disease is virtually unknown in Algiers proper, though common enough in the neighbouring districts. Then, too, the interval that separated the transfusion from the onset of the feverish attack roughly corresponds to the period of incubation of the fever. We are therefore justified in suspecting that the disease was conveyed at the time of the transfusion, especially as it turned out to be the same type of disease. With regard to the possibility of the transfer there were two occasions in the course of the operation when the transfer might conceivably have taken place: one when after isolating the patient's vein the surgeon proceeded to tap the donor's vein, and again when, after injecting the blood into the patient, he sutured the incision in the donor's arm.

The mere possibility of such a mishap renders it desirable to point to the importance of guarding against contamination by special precautionary measures to prevent any accidental transfer of infective material.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

APPENDICAL PUS IN A HERNIA SAC SIMULATING STRANGULATED HERNIA.

WHEN the points of the following case are reviewed in the light of facts exposed by the operation, it would seem theoretically possible to have established an exact diagnosis at the time of examination; but the actual difficulties of differentiation were so marked that the case is, in my opinion, worthy of note.

On August 17th, 1917, a young man, who gave the following history, was admitted to the Western Infirmary, Glasgow. Since childhood he had suffered from a right inguinal hernia which had on several occasions been so difficult to reduce as to require manipulation by his medical attendant. On the day previous to admission the patient was seized with pain in the right iliac region, and vomited once or twice. A few hours later his hernia, as he thought, became again irreducible because there was a very painful swelling in the scrotum which he could not put back. As on former occasions, therefore, he had to summon his doctor. Efforts to reduce the supposed hernia were unavailing, and the patient was sent into hospital.

I examined him shortly after his arrival and found a tense, elastic, inguino-scrotal swelling, which was so tender that any handling was intolerable. The temperature was 99.4°, and the pulse rate about 96.

When the patient was anaesthetized I found the scrotal swelling to be irreducible, and on palpating the abdomen detected distinct resistance in the right iliac fossa, suggestive of an abdominal abscess. It seemed best to open up the inguinal region first; when this was done I discovered a hernia sac full of pus, which had the odour characteristic of *B. coli* infection. The neck of the sac was found to be sealed by the inflammatory process, thus accounting for the irreducibility of the sac contents. The sac was ligated at the neck, after the adherent structures had been stripped off and excised. The inguinal wound was partially closed and drained by a rubber tube.

Using McBurney's method, I then opened the abdomen and found a gangrenous appendix surrounded by an abscess, fairly well walled off. The usual treatment was adopted for this and the patient made an excellent recovery.

Glasgow. CHARLES BENNETT, M.B.

HALLUX VALGUS OPERATION.

SEVEN years ago I operated on a lady for an exaggerated condition of hallux valgus of both feet, the great toes crossing completely over the second toe. The deformity of the left metatarso-phalangeal joint was very marked. The operation performed was that recommended by Mayo.

At the present time there is excellent movement of both great toe joints, and the inner side of the feet remains absolutely in a straight line; an *x*-ray photograph demonstrates the very excellent result obtained by adhering strictly to the technique of the operation as laid down by Mayo.

The only disability (so to call it!) is the necessity of wearing a shoe following the outline of a normal foot, the modern boot-maker's enormity not being tolerated.

W. B. COSENS, Major R.A.M.C.

Reviews.

STERILITY IN WOMEN.

THERE is no doubt that from the general point of view the time is ripe for the appearance of a monograph on *Sterility in Women*.[1] Unfortunately there has been no advance in our knowledge of the subject which makes such a book essential from the strictly professional point of view. Dr. GILES's little book with this title is, however, none the less assured of a welcome, for at a time like the present the general or social point of view must predominate. In the aftermath of the greatest war in history the subject of sterility assumes a national importance to an unexampled degree. The blight of unproductive marriage must be prevented or cured if the nation is to make up in numbers what, unfortunately, it can never wholly replace in quality.

But there is still another reason why the attention of the profession and of the public may well be drawn to the subject, namely, the prevalence of venereal disease. Syphilis and gonorrhoea between them account for an enormous proportion of sterility, and for what is so closely allied to it—pre-natal mortality. The dangers of syphilis are now being more fully realized by the public, but what is not recognized as it ought to be is that in the woman gonorrhoea, so often regarded by the male as a mere trifle, is on the whole the more serious disease of the two. This has become increasingly true in recent years with the great advances made in the treatment of syphilis. There is no disease more likely to doom a woman to either absolute or relative sterility than gonorrhoea—and to sterility combined with years of chronic ill health and constant suffering.

Dr. Giles's book is of necessity mainly a summary and digest of the best that has been written on the subject. Incidentally it may be noted that he has collected an admirably arranged bibliography, which will be of the greatest use to other investigators. The profession already knows and appreciates Dr. Giles's unusual capacity for reducing his facts to tabular form, and in the present volume he has compiled several interesting statistical tables in regard to sterility. His investigations have led him to a confirmation of his conclusion that fibroids are not so much the cause as the result of sterility. He also draws attention to a point of some importance—namely,

[1] *Sterility in Women*. By Arthur E. Giles, M.D., B.Sc., F.R.C.S. Edin. London: Henry Frowde, and Hodder and Stoughton. 1919. (Demy 8vo, pp. xv + 227; 11 figures. 10s. net.)

the effect of recurrent attacks of appendicitis in causing sterility. It is, of course, only in the last few years that appendicitis has been generally recognized as a source of pelvic infection, but the author's experience has led him to regard it as a not very infrequent cause of a degree of pelvic infection leading to the sealing up of the tubes and consequent sterility. This is a point of some significance which should not be overlooked by the practitioner.

The author very properly emphasizes the need for excluding the possibility of the husband being responsible for the sterility of unproductive wedlock before submitting the wife to anything of the nature of operative treatment. This golden rule is one that can bear endless repetition.

The section on treatment is rather disappointing, but in justice to the author it must be admitted that the intention of the book was not to describe methods of treatment so much as to indicate the extent to which most of the causes of sterility are amenable to treatment. At the same time there are some striking omissions. So far as we have observed there is not a word about the influence of the internal secretions in the female, or as to the indirect effect upon fertility arising from some disturbed conditions of the endocrine balance.

It is sincerely to be hoped that the publication of this book will have the effect of drawing increased attention to a problem of outstanding importance to our generation with a view to both prevention and cure.

NUTRITION AND DISEASE.

IN his interesting and well written little book on *The Newer Knowledge of Nutrition*[2] Dr. E. V. MCCOLLUM gives an admirable account of our present knowledge of the use of a varied diet in the preservation of health and vitality. In his first chapter he reminds his readers that the chemical analysis of a food or diet is not in itself adequate to answer the question whether it is suitable for nutrition, but must be supplemented by the biological method—that of feeding experimental animals; and he criticizes the hypothesis by which it is sought to account for beri-beri, scurvy, pellagra, and rickets as due to the lack of a specific chemical substance (or vitamine) in the diet. But it is not clear how far his criticism applies merely to the term "vitamine," which, so far as we are aware, nobody defends, and how far to the substance of the hypothesis. The "water-soluble B" substance he admits prevents the development of beri-beri, and "fat-soluble A" the form of malnutritional disease of the eye called xerophthalmia; but he seems to think that scurvy is not a deficiency disease, and to hold that the exact relation of rickets to diet is not yet clear.

The second chapter deals with experimental scurvy and the dietetic properties of vegetables; emphasis is laid upon the importance of eating the leaves as well as the seeds of plants. In the third chapter he points out that there is nothing in a vegetarian diet *per se* that makes it inadequate to nourish an omnivorous animal in a satisfactory manner, but admits that it is difficult to choose an adequate vegetarian diet. The fourth and fifth chapters deal with foods of animal origin and the diseases referable to faulty diets. The last two chapters are devoted to the needs of the nursing mother as reflected by the nutrition of the suckling, and to the practical considerations which should determine the planning of diets. The book forms stimulating reading, and should be studied by all, whether medical practitioners or not, who are directly interested in diets and feeding. But the author's theories and conclusions should be accepted only after critical examination.

INFECTION, IMMUNITY, AND SPECIFIC THERAPY.

THE success of Dr. KOLMER'S textbook[3] on the principles and essential details of the processes of infection and immunity, which was favourably reviewed in our issue of August 28th, 1915, has been shown by the necessity for a second edition in 1917, though it may be mentioned that the volume did not reach us until late in the following year. The present edition is on the same lines as the first, but contains eighty more pages and three additional coloured illustrations, and has been thoroughly revised. Thus, the Schick toxin test for immunity in diphtheria and active immunization in diphtheria with toxin-antitoxin mixtures receive special attention, the Schick reaction being illustrated by two figures. The section on the vaccine treatment of various infections has been enlarged, and after giving the evidence that vaccines may exert a non-specific influence—for example, the benefit resulting from typhoid vaccine in other diseases and the effects of protein "shock" therapy—the author expresses his opinion in favour of adhering to autogenous vaccines, and while admitting that their use may stimulate non-specific agencies of therapeutic value he considers that trust in the specific effects of vaccines should be maintained. The various skin reactions are fully described, and are illustrated by coloured plates. In the interesting chapter on chemotherapy the administration of salvarsan, which is perhaps the most complex drug employed in medicine, is described in detail, and the causation of the toxic effects discussed; jaundice being stated to be much more frequent after intramuscular than after intravenous injection. Analyses of salvarsan made by the author confirm the view that it cannot be regarded as an absolutely pure compound, and that it contains from 1 to 2 per cent. of sulphur which is not represented in the formula, and probably becomes attached to the arsenic during the process of reduction. This work is well written and admirably produced, and the high opinion of its merits expressed when the first edition was reviewed may be cordially endorsed.

DISEASES OF HEART AND AORTA.

CARDIOLOGISTS will welcome the third edition of Professor HIRSCHFELDER'S work on *Diseases of the Heart and Aorta*.[4] The form of the book is not appreciably altered, but the matter has been brought up to date by the incorporation of recent results. As in former editions, the book consists of four parts. The first is concerned with physiology and methods of diagnosis, the second and third with organic disease of the heart and aorta, and the fourth with functional cardiac disorders. The prominent place given throughout the work to physiological and experimental considerations will be appreciated by clinicians, who will here find up-to-date information in convenient form. The value of the book as a work of reference is thus enhanced. Clinical conditions are carefully described, and some excellent chapters are devoted to treatment. Many valuable hints are given on the management of cases, the sound principle of treating the patient according to "his own condition, sensations, and general appearance" being especially insisted on.

The bibliography at the end of each chapter should prove useful to many workers, though reference would be easier if the lists had been arranged in alphabetical order. British authors, too, are somewhat scantily represented. For example, in the discussion on the causes of angina there is no mention of Sir Clifford Allbutt's views, nor is there any reference to Professor Starling's work in the pages devoted to a consideration of the heart's output. The author has entirely failed to grasp the significance of the researches of Dr. Lewis and his co-workers on so-called "soldier's heart" or "effort syndrome." The condition is included by him under the heading of "primary cardiac overstrain," to which he devotes five pages. He begins by speaking of "functional weakness of the heart," and then proceeds to describe cases of obvious myocarditis—in one of which, indeed, a fibroid heart was found at autopsy.

Nevertheless, a vast amount of material has been used, and this probably accounts for a certain disjointedness, especially marked in the first half of the book. A summary of another writer's views is often inserted without an adequate effort to blend it into a harmonious whole with the rest of the text. In some places the effect is rather too obviously that of an interpolation made to bring the subject matter up to date.

[2] *The Newer Knowledge of Nutrition*. By E. V. McCollum, School of Hygiene and Public Health, the Johns Hopkins University. New York: The Macmillan Co. 1919. (Cr. 8vo, pp. ix + 190; illustrated. 6s. 6d. net.)

[3] *A Practical Textbook of Infection, Immunity, and Specific Therapy*. With Special Reference to Immunologic Technic. By John A. Kolmer, M.D., D.P.H., M.Sc., Assistant Professor of Experimental Pathology, University of Pennsylvania, etc. Second edition. Philadelphia and London: W. B. Saunders Co. 1917. (Roy. 8vo, pp. 978: 147 figures, 46 in colours. 32s. 6d. net.)

[4] *Diseases of the Heart and Aorta*. By Arthur Douglas Hirschfelder, M.D. Philadelphia and London: J. B. Lippincott Company. 1918. (Med. 8vo, pp. xxviii + 732; 20 plates, 325 figures. 30s. net.)

These defects are, however, outweighed by the large amount of information contained in the volume. Praise must be given to the numerous excellent illustrations and diagrams. By means of the latter, which are original and most ingenious, Professor Hirschfelder has succeeded in making clear many difficult points. The book is well worth perusal by all who are interested in the heart and its disorders.

NOTES ON BOOKS.

IN his book on *Modern Medicine and Some Modern Remedies*[5] Dr. T. B. SCOTT has put together some interesting generalities on heart disease, arterio-sclerosis, chronic bronchitis and bronchial asthma, and therapeutic speculations and doubts mainly connected with the influence of the organs of internal secretion. His notes represent the life's experience of a busy practitioner of medicine; such men, as Sir Lauder Brunton pointed out in his preface to the book, too rarely find time for the responsibilities of authorship. It is of interest to read that Dr. Scott has often hit the mark by aiming at random with thyroid extract in obscure medical cases; and in chronic bronchitis and asthma he has seen good result from vaccine treatment. His book may be cordially recommended to the attention of his fellow practitioners. The fact that it has reached a second edition is proof that it has met with much appreciation.

The Venereal Diseases Problem,[6] by Dr. J. K. WATSON, is a serviceable little book for nurses and midwives, and gives a good account of what they should know about the matter. It is clearly written, and may be recommended. Dr. CARLETON'S picture-book on *The Seriousness of Venereal Disease*[7] may be described as a two-shilling shocker composed, firstly, as an active deterrent for laymen who might be likely to expose themselves to the infection, and, secondly, as an encouragement to induce the infected to seek for adequate medical treatment. The book should prove effective.

The fifth edition of PALMER'S *Lessons on Massage*[8] has been brought up to date and contains an adequate account of the theory and practice of massage suited to the requirements of those about to take it up for a living. About half the book is devoted to an outline of the anatomy and physiology of the body; the rest deals briefly with the methods of massage and gymnastic treatment. The volume may be recommended to those for whose use it is designed.

[5] *Modern Medicine and Some Modern Remedies.* By T. B. Scott. With a preface by Sir Lauder Brunton, Bt., F.R.S. Second Edition. London: H. K. Lewis and Co. 1919. (Cr. 8vo, pp. 198. 6s. 6d. net.)

[6] *The Venereal Diseases Problem.* By J. K. Watson, M.D.Edin. London: Baillière, Tindall, and Cox. 1917. (Cr. 8vo, pp. xii + 54; 16 figures. 2s. 6d. net.)

[7] *The Seriousness of Venereal Disease.* By Sprague Carleton, M.D., F.A.C.S. New York: Paul B. Hoeber. 1918. (Cr. 8vo, pp. 67; 26 figures. 0.50 dol.)

[8] *Lessons on Massage, including Swedish Remedial Gymnastics and Bandaging.* By Margaret D. Palmer. Fifth edition. London: Baillière, Tindall, and Cox. 1918. (Demy 8vo, pp. x + 340; 135 figures. 10s. 6d. net.)

MEDICAL AND SURGICAL APPLIANCES.

LIQUID AIR AS A SOURCE OF OXYGEN.

AIR was first liquefied nearly thirty-five years ago as a laboratory experiment; by 1891 it could be produced in quantities large enough for scientific research. Now it is manufactured as a commercial product, and has been much used by the Air Force to supply oxygen to aviators at high altitudes where the partial pressure of oxygen in inspired air was so low as to produce symptoms of anoxaemia.

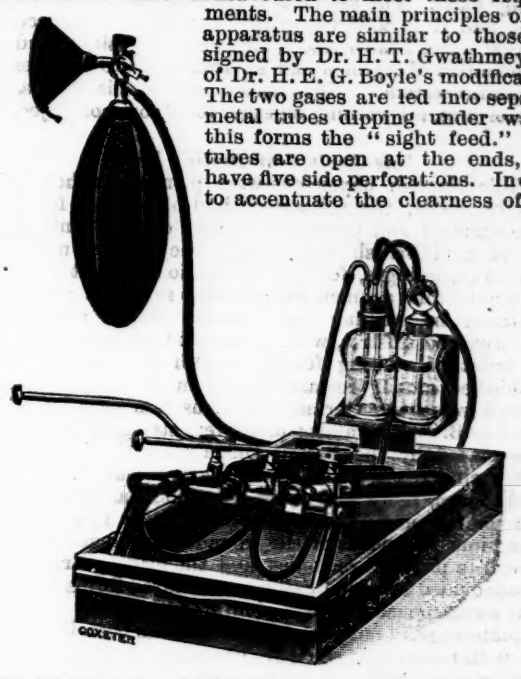
To liquefy a gas it must be cooled below its critical temperature, and to maintain it in the liquid state it must be protected from external heat. In 1892 Sir James Dewar first used a two-walled glass vessel to overcome this second difficulty, making the vacuum flask which has since become a household article. In the liquefaction of air the nitrogen and oxygen come down together as a homogeneous liquid, but as the nitrogen evaporates first the liquid becomes gradually richer in oxygen. In recent years liquid air machines have been used for obtaining oxygen from the atmosphere and by fractional distillation a liquid can be obtained containing proportions of oxygen up to 80 per cent. Oxygen so produced is used in the arts, especially in the process of welding, but during the war it was found that as the liquid can be conveniently enclosed in a vacuum vessel made of copper it afforded a light, portable, and convenient means of supplying oxygen to aviators at high altitudes.

The Liquid Air and Rescue Syndicate (Park Royal, Willesden, London, N.W.10), a company from which the Air Force obtained supplies, is now considering the possibility of placing liquid air containing up to 70 or 80 per cent. oxygen at the disposal of the medical profession. The great advantage claimed for the liquid air container over the oxygen cylinder is that it is lighter and more portable and convenient. It is calculated that a cylinder of oxygen, yielding six cubic feet of gas, weighs 9¼ lb., and that a spherical container for liquid air which will yield 57 cubic feet of gas containing 70 to 80 per cent. of oxygen weighs 8½ lb. At present the price of a quantity of liquid air yielding 600 cubic feet in a gaseous state is about 20s., but it is believed that if the demand is considerable the price can be materially reduced. The cylinder, of course, cannot be closed, so that there is a continual loss of gas, which amounts, we believe, to about 5 per cent. in twenty-four hours.

GAS-OXYGEN APPARATUS.

Mr. GEOFFREY MARSHALL, M.B., B.S., whose paper on the administration of anaesthetics at the front, published in our columns on June 2nd, 1917, will be remembered, writes:

The chief requirements of an apparatus for the administration of gas-oxygen anaesthesia are easy control, simplicity, and clear indication of the relative proportions of the gases administered. Portability is also of great importance for work outside hospitals. In the apparatus illustrated I have endeavoured to meet these requirements. The main principles of the apparatus are similar to those designed by Dr. H. T. Gwathmey and of Dr. H. E. G. Boyle's modification. The two gases are led into separate metal tubes dipping under water; this forms the "sight feed." The tubes are open at the ends, and have five side perforations. In order to accentuate the clearness of this



indicator I have had the tubes curved so that the streams of bubbles from consecutive holes ascend separately to the surface of the water; the first and third holes are marked by bosses. The perforations in the N_2O feed tube are twice as large as those in the O_2 tube, and the N_2O feed is capable of a greater delivery of gas than previous models of this type. The advantages are that it is less often necessary to supplement the anaesthesia with ether, and that rebreathing may be dispensed with if thought undesirable. Excessive rebreathing is known to result in headache and nausea; I also found that it led to an after-fall of blood pressure when dealing with exsanguinated patients.

The stand consists of a light wooden box shaped like a suit case, with leather handles for carrying. It is just wide enough to accommodate three cylinders side by side, two 50-gallon N_2O and one 15-gallon O_2—that is, sufficient for about one and a half hours' anaesthesia. A larger model takes cylinders of twice this capacity. The nozzles of the cylinders are fixed to a metal bar by flanged connexions, the bar is raised on hinged struts when the apparatus is in use. The rest of the apparatus, sight feed, ether bottle, bag, mask, etc., fit into the lid for packing; there is also room for a small spare cylinder. A spirit lamp keeps the N_2O tap from freezing. Fine adjustment valves are dispensed with, as I have found that long lever keys on the

cylinder taps give a control of sufficient delicacy for all occasions; we thus save considerable weight and at the same time avoid the main source of gas leakage. The gases are led first to the sight feed, thence to a graduated three-way cock on the ether chamber, and finally by a long flexible tube to the Hewitt valve on the face-piece. The freshly mixed gases are therefore delivered in front of the rebreathing bag and as near as possible to the face-piece, with the advantages that a modification of the mixture affects the patient promptly, also that when rebreathing is employed the current of freshly delivered gases entering close to the mask prevents excessive concentration of carbon dioxide and obviates the laboured character of the breathing which is seen when gases are led directly into the rebreathing bag.

A larger apparatus intended for hospital use is of similar design, except that the stand will take cylinders of the larger sizes, up to 500-gallon N_2O and 40 ft. oxygen. The cylinders stand vertically on a base which moves on castors. I have given these two types of apparatus an extended trial in both military and civil work and found them satisfactory.

HARROGATE SPA.

THE word "spa"—or "spaw," as our forefathers sometimes wrote it—came originally from the Belgian town. As time went on it grew to be a general name, first for a mineral spring, and then for the locality in which such springs exist. The notion of a spa has widened in modern days, and it is well recognized now that for a successful mineral water health resort, climate and position and the organization of regimen and environment are as necessary as natural waters. "Spas need clinics, special hotels, and sanatoriums, all working together for a common object."[1]

The Revival of British Spas.

While English physicians were pioneers in the medical uses of water, the science of hydrology was for many years studied and developed mainly on the continent of Europe, and British spas, though they possess unrivalled natural advantages, fell out of fashion. Great ingenuity and commercial acumen, and no little scientific skill, were employed in pushing the mineral water stations of Germany and Austria, with the result that before the war the habit of visiting foreign health resorts was firmly established among certain classes in this country. Now for five years the German and Austrian spas have been closed to British invalids; moreover, stringent restrictions were placed by the Permit Office upon those wishing to visit such French and Italian spas as remained open. In consequence, more and more attention has been directed towards the neglected merits of British spas. At the same time the needs of the wounded awakened an active interest in physical remedies, and the leading British spas have provided remedial baths and kindred forms of treatment for immense numbers of military patients.

Another useful outcome of the war has been the linking up of the seven principal home spas—Bath, Buxton, Cheltenham, Droitwich, Harrogate, Llandrindod Wells, and Woodhall—into the British Spa Federation. Its object is to bring before our own countrymen the legitimate claims of British mineral water health resorts, and by joint action to increase the efficiency of their organization and equipment.[2]

An important point, which we trust is appreciated by all members of the federation, is the need for placing the entire machinery for the good of patients under medical guidance. Powerful waters and many sorts of baths will not suffice unless attention is given to the whole course of the visitor's life in the spa, including his dietary. In this respect there is still a good deal to be learnt from our late enemies, and if British spas are to come into their own the lesson must be applied promptly.

Harrogate Mineral Waters.

Harrogate is remarkable for the number and variety of its mineral springs. The first of these, the Tewit chalybeate well, was discovered by Sir William Slingsby, of Bilton Hall, towards the close of the sixteenth century. One by one further springs were found and described; the first of the saline-sulphur springs known as the "old sulphur well" was discovered about 1656. At the present time there are as many as eighty-seven known springs within the district, all differing in strength and quality. For a long while the progress of Harrogate as a health resort and spa was slow, but its popularity has increased enormously in the last thirty years. Readers of *Humphrey Clinker* who know Harrogate to day must smile at Matt. Bramble's description of the place as a "wild common, bare and bleak, without tree or shrub, or the least signs of cultivation; and the people who come to drink the water are crowded together in paltry inns." A bracing site on an uneven raised plateau among the Yorkshire moors, and a comparatively dry climate give it great natural advantages. The town is handsomely built, with fine open spaces; the surrounding country is picturesque, and good roads lead to such beautiful places in the neighbourhood as Fountains and Bolton Abbeys. Moreover, for those in search of health, the means for outdoor and indoor recreation are provided on a lavish scale.

The many kinds of Harrogate waters fall into two main groups—the sulphur waters and the iron waters. Before the war Professor Arthur Smithells, F.R.S., of the University of Leeds, had undertaken to make a scientific survey of the mineral springs, but service in the army has delayed his report. On the basis of previous analyses made by chemists at various times, the waters from the eighty-seven springs have been classified for therapeutic purposes into the saline-sulphurs, strong and mild; the saline-iron group, the members of which contain varying amounts of ferrous carbonate; and lastly, the waters from certain wells containing very little sodium chloride, of which two sub-classes are recognized — the alkaline-sulphur waters rich in carbonates, and the so-called pure chalybeates wherein the sulphides are replaced by ferrous carbonate. By reason of the remarkable geological formation of the district, iron springs, sulphur springs, and pure saline springs, although arising within a few yards of one another, yet remain chemically distinct and have different therapeutic properties.

Of the mineral waters at Harrogate sixteen are used for internal administration; the rest are employed only for bathing. The strong sulphur waters are hypertonic as compared with the blood content of sodium chloride, and, as is well known, their effect when drunk is laxative, the volume and weight of the faeces being much increased. These waters have long been used in the treatment of metabolic disorders and affections of the alimentary tract. It is supposed that the absence of depression, after a few days of this aperient course, may be due to the barium chloride which the water contains. The diuretic effect of the saline-sulphur waters is most pronounced in that from the "magnesia well." The alkaline-sulphur waters are hypotonic, as also (though to a less degree) are the mild waters of the saline-sulphur group. All the waters of the alkaline-sulphur class tend to constipate; they are employed in selected cases of mucous diarrhoea and in chronic tropical dysentery, but for the most part they are used outwardly.

The Baths of Harrogate.

In order to make the best use of these mineral waters the Harrogate Corporation, in whom they are vested, has spent nearly a quarter of a million pounds on the provision of modern bathing establishments. Besides the local sulphur water baths, apparatus for almost every approved balneological and electrical treatment has been set up, and to these have lately been added a mechano-therapeutic installation on the Borderel-Zander system, from the Northern Command Dépôt at Ripon, thus making possible the combined application of physical agencies of various kinds. At the Royal Baths more than seventy different baths, packs, douches, massage-douches, electrical treatments, and accessory treatments are given by trained attendants. The Victoria Baths, near at hand, are somewhat less elaborate, and the prices are lower. The Starbeck Baths, where alkaline-sulphur waters can be used at the source, are mainly kept for skin cases, and for others in which isolation may be desirable. There is also a small sylvan bathing establishment at Harlow Car, outside the town. One of the features of the main establishment is the peat bath. The ferruginous peat-moss of the neighbouring moors is ground up on the

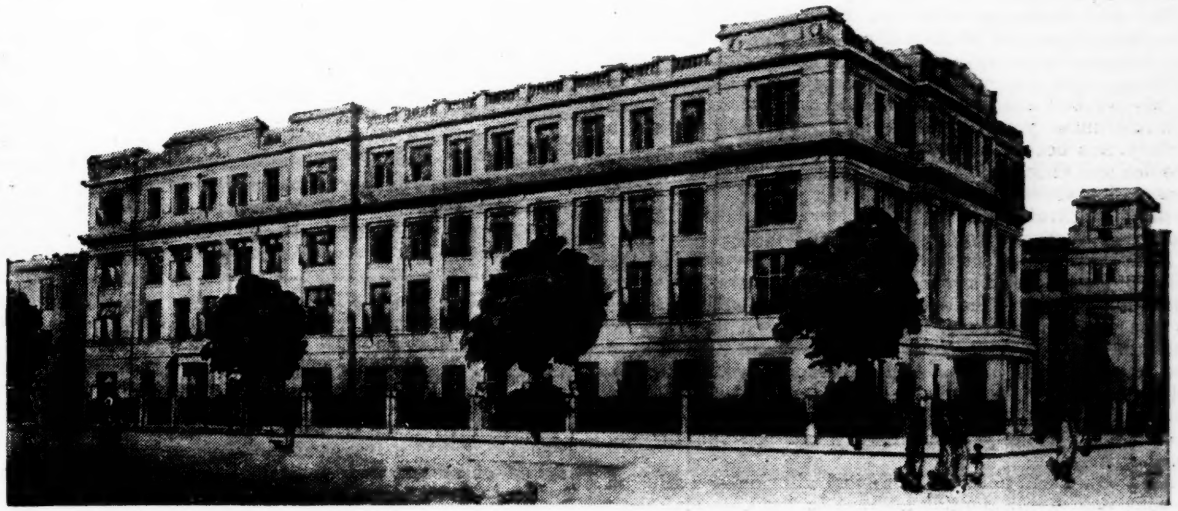
[1] Sir Bertrand Dawson, G.C.V.O., M.D., *The Nation's Welfare*, p. 36.

[2] *British Spas and Health Resorts*, the official publication of the Federation of British Spas, prepared with the assistance of the Local Medical Committees, with an introduction by R. Fortescue Fox, M.D. London: E. J. Burrow. (2s. net.)

premises and mixed with plain or mineral water. This hot peat mash keeps up a nearly uniform temperature during the period of immersion, and has the effect of a universal poultice. Another well-planned building is set apart for the "Plombières treatment" by intestinal lavage with sulphur water, the internal douche being followed by immersion in a sulphur bath at 98° F., combined with a subaqueous or "Tivoli" abdominal douche at a higher temperature. Among the newest installations are aërated baths, "whirlpool" baths for stiff joints and contractures, and molten paraffin wax baths for treatment of the extremities.

More than twenty years ago Dr. Charles Gibson claimed in these columns that the reputation of Harrogate rested upon a solid foundation, "for nowhere will one find so many, so rich, and so varied springs within so small a space." But the Continental watering places, he remarked, had taken the cream of the patients and reaped a golden harvest. Fashion, however, even then had begun to turn her face towards the neglected home health resorts, and many physicians were already sending patients to Harrogate, Bath, and Buxton. "We have no *kur taxe*," Dr. Gibson added, "but our corporate authorities have built a magnificent suite of baths upon the most modern and up-to-date ideas."

From personal observation this summer we are satisfied that Harrogate has well maintained its progress since those lines were written. It may be added that, to induce members of the medical profession to test for themselves Harrogate's claim to rival the best of the Continental spas, the management of the baths and wells have made arrangements for visits at reduced tariff rates and for free trial of the baths and waters, and a short account of the mineral springs and treatments has been prepared for medical practitioners by the Harrogate Medical Society.



Institute of Tropical Medicine and Hygiene, Calcutta.

CALCUTTA SCHOOL OF TROPICAL MEDICINE AND HYGIENE.

RATHER over five years ago we recorded that Lord Carmichael, then Governor of Bengal, had recently laid the foundation stone of the School of Tropical Medicine in Calcutta, to be erected, with the assistance of the Government, by a fund founded by Sir Leonard Rogers, I.M.S., Professor of Pathology in the Calcutta Medical College. A little over three years ago we reported that the foundation stone of a hospital for tropical diseases, to be erected in the immediate neighbourhood of the school, had been laid by the Governor. Two years ago we mentioned that the hospital was nearing completion and that plans were in preparation to complete the north wing of the laboratory.

The opening of the whole institution is still delayed by the slowness of medical demobilization in India, which has recently been accentuated by the Punjab rebellion and Afghan war. In the meantime the extension of the laboratories to include a hygiene institute, which was under consideration when we last wrote, has been pushed on, thanks to the generous offer of the Indian Research Fund Association, on the recommendation of the late Sir Pardey Lukis, of a grant of one lakh on condition that the Bengal Government gave a like sum. This condition was readily accepted by the Governor of Bengal, Lord Ronaldshay. Further difficulties in finding a new site for the long condemned police morgue, which had to be removed to clear the site for the extension, having at length been overcome, the addition has been commenced; money has also been found by the Endowment Fund (which has now reached the equivalent of over £60,000) and the Bengal Government jointly, to complete the top floor of the whole building at the same time that the extension is being constructed. This will provide accommodation for additional research workers, for whom endowments have been obtained, and for future requirements.

The fine building of four stories shown in the illustration stands on the new 100-foot central road of Calcutta; it will have 220 feet of north light, and will be connected by a short footbridge with the present pathological laboratory and museum of the Medical College, a portion of which is seen on the left of the photograph. In this laboratory much research work on tropical diseases has already been done. The special hospital for tropical diseases, one end of which is seen on the right of the illustration, has been built entirely by public subscription. It contains 116 beds, and has been completed as a part of the school, at a cost of £30,000 at the present rate of exchange, while an equal sum has been invested as a permanent endowment of research in addition to the £5,000 a year promised for five years by the Calcutta commercial interests for the same purpose.

It was originally hoped to have opened the School of Tropical Medicine in Calcutta in 1915; it is now expected that things will be sufficiently settled to enable this to be done in June, 1920, when a short three months' course will be held; the full six months' courses for the diplomas in both Tropical Medicine and in Public Health will begin in the middle of October, 1920. The institution, it is hoped, will, when in full working order, have a staff of eight professors and four or more additional research workers in place of the one pathologist, who has laboured single-handed for so many years in the finest field for research on tropical diseases in the world, and who has had the good fortune to originate and carry the scheme through to its approaching completion.

We congratulate Sir Leonard Rogers on the completion of a task to which he set himself some ten years ago—the establishment of a really first-rate school of tropical medicine and hygiene in Calcutta. It will, we trust, be maintained on the line on which he has set it, and will always receive from the Government of India the encouragement and support it so fully deserves.

PRESENTATION TO SIR WILLIAM OSLER.

THE presentation to Sir William Osler, Regius Professor of Medicine in the University of Oxford, of a collection of essays in two volumes took place at the house of the Royal Society of Medicine on July 11th, the eve of his 70th birthday. The contributions to the volumes number 150, and include representative members of the profession on both sides of the Atlantic—physicians, surgeons, physiologists, anatomists, pathologists, and historians.

The large audience included, in addition to those mentioned in the course of the proceedings, Surgeon Vice Admiral Sir Robert Hill, K.C.M.G., C.B., Medical Director-General R.N., Lieut.-General Sir John Goodwin, K.C.B., Director-General A.M.S., and Major-General G. la F. Foster, C.B., Director-General Medical Services, Canadian Forces.

The presentation was made, in the name of the great body of subscribers on both sides of the Atlantic, by Sir CLIFFORD ALLBUTT, Regius Professor of Physic in the University of Cambridge, who said:

My dear Colleague,—To me, as one of your oldest friends in time, and perhaps the oldest in age, has fallen the honour of announcing our celebration of your seventieth birthday—one anniversary of many years of supreme service in two kindred nations and for the world. The last lustrum of your threescore and ten, if now merged in victory, has been a time of war and desolation, of broken peoples, and stricken homes; yet through this clamour and destruction your voice, among the voices in the serener air of faith and truth, has not failed, nor your labour for the sufferings of others grown weary.

But, while thus we celebrate your leadership in the relief of sickness and adversity, we are far from forgetting the sunnier theme—the debt, none the less, which we owe to you in other fields of thought. In you we see the fruitfulness of the marriage of science and letters, and the long inheritance of a culture which, amid the manifold forms of life, and through many a winter and summer, has survived to inspire and adorn a civilization which so lately has narrowly escaped the fury of the barbarian.

And now I will not avoid a topical allusion—an allusion to your recent presidential address to the Classical Association at Oxford; an address which, in its various learning, its wisdom, and its wit, brilliantly illustrated this fecundity of letters and science, embodied the common spirit of science and art, and conferred a distinction upon our profession.

In these volumes we hope you will find the kind of offering from your fellow workers which will please you best—immaterial offerings indeed, but such as may outlive a more material gift. As to you we owe much of the inspiration of these essays, and as in many of their subjects you have taken a bountiful part, so by them we desire to give some form to our common interests and affections.

We pray that health and strength may long be spared to you and to her who is the partner of your life; and that for many years to come you will abide in your place as a Nestor of modern Oxford, as a leader in the van of Medicine, and as an example to us all.

The speaker then handed the volumes to Sir William Osler amid prolonged applause.

Sir WILLIAM OSLER, whose speech at times betrayed his emotion, said:

Sir Clifford Allbutt, Ladies and Gentlemen,—As the possessor of a wild and wagging tongue that has often got me into trouble, I thought it would be better on such an occasion to make full notes beforehand of what I wanted to say. Two circumstances deepen the pride a man may justly feel at this demonstration of affection by his colleagues on both sides of the Atlantic—one, that amid so much mental and physical tribulation my friends should have had the courage to undertake this heavy two-volume task, and the other, that this honour is received at the hands of my brother Regius, a friend of more than forty years. (Applause.) There is no sound more pleasing than one's own praises, but surely an added pleasure is given to an occasion which graces the honourer as much as the honoured. To you, Sir Clifford, in fuller measure than to any one in our generation has been given a rare privilege: to you, when young, the old listened as eagerly as do now, when old, the young. (Applause.) Like Hai ben Yagzan of Avicenna's allegory, you have wrought deliverance to all with whom you have come in contact.

To have enshrined your gracious wishes in two goodly volumes appeals strongly to one the love of whose life has been given equally to books and to men. A glance at the long list of contributors, so scattered over the world, recalls my vagrant career—Toronto, Montreal, London, Berlin, and Vienna as a student; Montreal, Philadelphia, Baltimore, and Oxford as a teacher. Many cities, many men. Truly with Ulysses I may say, "I am a part of all that I have met."

Uppermost in my mind are feelings of gratitude that my lot has been cast in such pleasant places and in such glorious days, so full of achievement and so full of promise for the future. Paraphrasing my lifelong mentor—of course I refer to Sir Thomas Browne—among multiplied acknowledgement I can lift up one hand to heaven that I was born of honest parents, that modesty, humility, patience, and veracity lay in the same egg, and came into the world with me. To have had a happy home in which unselfishness reigned, parents whose self-sacrifice remains a blessed memory, brothers and sisters helpful far beyond the usual measure—all these make a picture delightful to look back upon. Then to have had the benediction of friendship follow one like a shadow, to have always had the sense of comradeship in work, without the petty pinpricks of jealousies and controversies, to be able to rehearse in the sessions of sweet, silent thought the experiences of long years without a single bitter memory—to have and to do all this fills the heart with gratitude. That three transplantations have been borne successfully is a witness to the brotherly care with which you have tended me. Loving our profession, and believing ardently in its future, I have been content to live in it and for it. A moving ambition to become a good teacher and a sound clinician was fostered by opportunities of an exceptional character, and any success I may have attained must be attributed in large part to the unceasing kindness of colleagues and to a long series of devoted pupils whose success in life is my special pride.

To a larger circle of men with whom my contact has been through the written word—to the general practitioners of the English-speaking world—I should like to say how deeply their loyal support has been appreciated. Nothing in my career has moved me more, pleased me more, than to have received letters from men at a distance—men I have never seen in the flesh—who have written to me as a friend. And if in this great struggle through which we have passed sorrow came where she had not been before, the blow was softened by the loving sympathies of many dear friends. And may I add the thanks of one who has loved and worked for our profession, and the sweet influences of whose home have been felt by successive generations of students?

To the Committee and the Editors I am deeply indebted for the trouble they have taken in these hard days, and to the publisher, Mr. Paul Hoeber, for his really pre-war bravery; and our special thanks are due to you, kind friends—and in saying this also I would associate Lady Osler with myself—who have graced this happy ceremony with your presence. (Loud applause.)

Sir D'ARCY POWER, in proposing a vote of thanks to Sir Clifford Allbutt, said that this was probably the first instance in which the two Regius professors of the great Universities of Oxford and Cambridge had come together on such an occasion.

Sir DONALD MACALISTER said that when it was known that the Regius Professor at Cambridge had undertaken to make the presentation to the Regius Professor at Oxford, all were sure it would be done in the most perfect possible way. The variety of learning, the wit, and the wisdom, and the deep feeling which characterized his utterance in making the presentation fully justified the expectations. As Cambridge and Oxford had joined in giving and receiving, it was fitting that Cambridge as well as Oxford should join in offering thanks to him who had graced the chair.

Sir CLIFFORD ALLBUTT said, in reply, that it was really for him to thank those who had given support on an occasion to be described, perhaps, as unique, and for having been permitted to voice their feeling.

[Subscriptions are still being accepted and may be sent to the English publishers of the essays, H. K. Lewis and Co., Limited, 136, Gower Street, W.C.]

British Medical Journal.

SATURDAY, JULY 19TH, 1919.

THE THERAPEUTICS OF OXYGEN.

THE lecture by Dr. J. S. Haldane, in spite of the unhappy term anoxaemia in its title, should be read by every practitioner whatever his line of practice. It is not altogether easy reading, for the subject is complicated, and many of the facts are new even to physiologists; some of them, indeed, have not previously been published, but the matter it deals with is of fundamental importance. A man may go without food for weeks, without water for days, but without oxygen for seconds. It is therefore not surprising that an insufficient supply of oxygen to the tissues—a condition to which the term anoxaemia has been applied—should seriously interfere with the primary functions, although the reserve power is so great that the evil effects may be more or less completely compensated, at any rate for a time and after a time.

The purpose of Dr. Haldane's lecture is to explain the evil effects of an insufficient supply of oxygen to the tissues, the manner in which they are brought about, the bodily mechanism by which they are averted or diminished, and the means the physician can take to assist nature while the struggle is going on, the chief of these being the administration of oxygen by inhalation. The haemoglobin in human arterial blood is nearly saturated with oxygen. In addition to this chemically combined oxygen a very small amount of oxygen is present in free solution in the blood, and as the blood passes round the circulation this free oxygen is continuously being passed on to the tissues and being replenished at the expense of the oxyhaemoglobin. For the maintenance of the normal state in this respect certain primary conditions must be fulfilled—the breathing must produce sufficient ventilation of the lung, the alveoli must be in good order, the circulation must be effective, and the haemoglobin normal. Failure in any one or more of these respects tends to anoxaemia. Further, the respiratory centre must be in a state to respond to its normal stimuli. In toxaemic conditions the centre being poisoned responds less readily, and Dr. Haldane considers that the evidence now available makes it probable that one of the most common immediate causes of death is failure of the respiratory centre rather than of the heart, though if the former fails the latter must soon fail also.

An observation by Bohr of Copenhagen, on the great importance of which Dr. Haldane insists, is that if the normal proportion of CO_2 in the blood is diminished the haemoglobin holds on more tightly to the oxygen and the oxygen in free solution in the blood is diminished. Forced breathing, which by over-ventilation diminishes the normal proportion of CO_2 in the blood, produces anoxaemia, but Hill and Flack have shown that when the forced breathing is performed, not with air but with pure oxygen, the symptoms of anoxaemia are greatly diminished, no doubt because the proportion of oxygen in free solution is restored. It is owing to its acid properties that CO_2 acts on the respiratory centre, the activity of which is regulated with minute accuracy in relation to the proportion of CO_2 in alveolar air. But the respiratory centre is stimulated also by want of oxygen, to which it reacts still more promptly than to excess of CO_2; the effect of the increased breathing due to this stimulation of the respiratory centre may be to take still more CO_2 out of the arterial blood, producing a condition in which the acid element is diminished—that is to say, the hydrogen-ion concentration is lowered; and to this condition the term alkalosis is applied. When this alkalosis is brought about the kidneys and liver at once begin to adjust the balance in the blood, the kidneys by excreting more alkali, and the liver by making ammonia instead of urea; but they need a relatively long time —several days—to produce their effects.

In uncomplicated anoxaemia there is a vicious respiratory circle. The respiratory centre is exhausted by the anoxaemia, and this exhaustion renders the breathing shallow, though it may be rapid; and the shallow breathing, as has recently been experimentally shown, increases the anoxaemia. Anoxaemia, however produced, is in itself a danger, causing damage to the tissues, which, as in poisoning by carbon monoxide, may persist and cause death even when the cause of the anoxaemia is completely removed. But in many of the acute conditions in which, as has been said, anoxaemia is set up it is not uncomplicated, for the respiratory centre is poisoned and its sensitiveness thereby diminished. The whole of the delicately adjusted mechanism for the maintenance of the oxygen equilibrium falls out of gear when the respiratory centre—the man in the car—ceases to maintain efficient control. It is in these circumstances that the value of oxygen inhalation becomes apparent; the defect in the amount of oxygen in the arterial blood can in this way be supplied. It helps to break the vicious circle of anoxaemia, and allows the crisis to be tided over—the oxygen exchanges of the organism working at a lower level—until the balance can be adjusted, thus giving the body time for adaptation or recovery.

A conclusion of administrative importance is to be drawn: it is that means for the efficient administration of oxygen should be at hand. Dr. Haldane tells us that failure of the respiratory centre seems often to occur with dramatic suddenness, usually in the night, and must be dealt with by administering oxygen without the slightest delay. The vicious circle of respiratory failure can produce its effect very rapidly, even in a normal healthy person, and it follows that in a patient whose respiratory centre is already weakened by the results of infection the failure may be far more rapid; fortunately, recovery on giving oxygen is equally rapid. This lesson was learnt during the war in the treatment of men suffering from irritant gas poisoning; the condition was met by the apparatus Dr. Haldane describes; but it may also be met, perhaps more effectively, by the oxygen chamber, with which experiments have been made at Cambridge and at Stoke-on-Trent.

THE REPRESENTATIVE MEETING.

THE constitutional unit of the British Medical Association is the local Division. For certain specific purposes under the requirements of company law the governing body of the Association is the general meeting in which every member has a right to take part. But for all other purposes the general control and direction of the policy and affairs of the Association is vested in the Representative Body, which is composed of members elected by the Divisions, and of members of the Council. Thus every member, through his or her Division, is entitled to a share in the government of the Association. Since the reorganization which took place in 1902 it has been the

policy of the Association to reduce the duties of the general meeting to the least amount compatible with the law, and to place the bulk of the responsible deliberative work upon the Representative Body. The central executive of the Association is the Council, whose duty it is to carry into effect the resolutions of a general meeting or of the Representative Body, and to administer the affairs of the Association in accordance with the memorandum of association and the regulations and by-laws.

The basis of the discussions by the Annual Representative Meeting is the Council's report on the general state and proceedings of the Association for the past year, which is issued in the spring together with the balance sheet and financial statement and an estimate of income and expenditure for the coming year. The annual report of Council for 1918–19 was printed in the SUPPLEMENT of May 3rd, and a supplementary report appeared in the SUPPLEMENT of July 5th. At the forthcoming Annual Representative Meeting to be held in the Connaught Rooms, London, at the close of next week, the first business will be to receive these statutory documents; and the various recommendations contained in the Council's reports will come before the meeting as motions. The agenda will include also motions and amendments arising out of reports of Council or committees, and other motions found by the Agenda Committee to be in order. By-law 42 prescribes that "in speaking and voting upon any matter the representative, or representatives, of any constituency shall have regard and so far as may be conform to the preponderance of opinion of the members of that constituency so far as it is known to him or them." Upon this we may remark that the Council has drawn attention in its report to an idea prevalent in some quarters that the individual member has little or no voice in the conduct of the Association's affairs, especially when unable by reason of war conditions to attend a Division meeting, or record a vote by post. The Council expresses the view that there are few, if any, similar bodies in which the individual member who cares to take the trouble has greater power to influence the affairs and policy of the organization. Machinery exists for nomination by post of members for election as representatives or as Branch or Divisional office-bearers.

The question of trade unionism in medicine is referred to in the Council's report, and will no doubt be discussed by the Representative Body. The arguments for and against should be fairly well known by now. The Council has sought the advice of Mr. Gore Browne, K.C., and Mr. H. H. Slesser, standing counsel to the Labour Party, and their opinion[1] conforms with the legal advice previously received. In the opinion of these counsel a medical man, whether employed at a salary or practising in the ordinary way for fees, is not a person employed in trade or industry, and is not "a working man" within the meaning of the Trade Disputes Act, 1906; accordingly, a dispute as to the terms or conditions of employment of a medical man is not a trade dispute within the meaning of the Act. Little or no advantage, in their opinion, would be derived from registration as a trade union in a case in which claims were raised like those raised in the Coventry action. Lastly, a trade union has not the benefit of limited liability that is enjoyed by the British Medical Association so long as it remains a company registered under the Companies Acts. Such is the legal position as interpreted by lawyers specially conversant with trade union law; but had their opinion gone the other way there would still exist the deep-rooted dislike felt by large numbers of our profession to the application to medicine of trade unionism and all that it implies. Notwithstanding the great activity of the advocates of a medical trade union during the past year, we would hazard the guess that the Representative Body, when this question has been debated, will once more reject the doctrine. The strength of trade unionism lies not in forms or laws, nor in any immunity from legal process, but in the solidarity and discipline it has bred and the power thus given to bring about a strike; but no one has yet been able to show how the medical profession could use the strike weapon even if the majority were willing.

During the past few months the conditions of service under the Insurance Acts have been discussed by the medical profession throughout the country, both in local meetings and in grouped conferences, and as we go to press the whole matter is under consideration by the special conference of representatives of Local Medical and Panel Committees which is being held in London. It is well recognized that these topics affect not only panel practitioners but the interests of the whole profession, and many of them will come up again for discussion at the Representative Meeting next week. In particular the Council holds it to be essential that the Representative Body should consider the memorandum of discussions lately issued by the Insurance Commissioners to all members of the profession, and paragraph 106 of the Insurance Acts Committee's report known as document M. 25, which deals with the conditions for extra services and raises important questions of general policy. The Council, therefore, recommends that each subsection of paragraph 106 should be discussed separately, and the opinion of the Representative Body expressed thereon.

[1] BRITISH MEDICAL JOURNAL, March 22nd, 1919, p. 348; SUPPLEMENT, May 17th, 1919, p. 100.

INSURANCE FOR MEDICAL MEN.

THE Medical Insurance Agency, which was founded twelve years ago with the object of assisting medical men to obtain the best terms of insurance of all kinds, including life insurance, accident insurance, and the insurance of motor cars, has from the first kept in mind as one of its chief objects the assistance of the benevolent institutions of the profession. The managing committee of the Agency, at its half-yearly meeting on July 10th, was able to make interim allotments amounting to £455—£125 to the Royal Medical Benevolent Fund, £125 to the Royal Medical Benevolent Fund Guild, £105 to Epsom College Royal Medical Foundation, and £100 to the Royal St. Anne's School. The Royal Medical Benevolent Fund is one of the best known institutions in the profession, and its offspring, the Guild, is doing most admirable work, its special feature being the personal interest shown by individual ladies in its work. It has seemed to the Agency that one of the most practical means it could take to help less fortunate members of the profession was to contribute to the education of children. This it has done by subscriptions to Epsom College, where boys are received on the foundation, and by subscription to the Royal St. Anne's School, where girls receive an excellent education. This benevolent side of the Agency's work has commended it to many members of the profession, though not to so many as might have been expected to resort to it. Last year the total distributed from the Agency's medical benevolence account was £1,002 10s., included in which was a gift of £100 to the Belgian Doctors' and Pharmacists' Relief Fund, which was closed early this year. It also contributed £150 to the War Emergency Fund of the Royal Medical Benevolent Fund. It should further be understood that the insurer himself receives an advantage

by the return out of the commission received by the Agency of certain sums which in 1918 totalled £697, bringing the whole amount returned since the foundation of the Agency up to £7,200, a sum which represents a direct saving to the profession. The Agency is not bound to any particular companies or forms of policy, and is able to advise medical practitioners contemplating insurance as to the best form of policy to suit their particular conditions. The life insurance business conducted through the Agency is considerable, and it is confidently anticipated that as the conditions disturbed by the war become more stable this part of its business will largely increase. The insurance of motor cars is becoming a very large part of the business; in spite of the difficulties in the way of motorists created by the war and the shortage of petrol and of cars the number of motor insurances has increased, and experience has proved that the Agency, owing to the amount of business it conducts in this direction, is able to assure to its clients that their claims shall be promptly and generously met. In presenting the financial report the chairman, Dr. G. E. Haslip, was able to speak in the most hopeful terms of the future of the Agency, and mentioned that vacancies, due to deaths of several members of the committee, had been filled by the election of Dr. E. Weaver Adams, Dr. H. A. Des Vœux, Lieut.-Colonel R. H. Elliot, I.M.S., Dr. R. A. Gibbons, and Dr. R. Langdon-Down.

A FLOATING SCHOOL OF TROPICAL MEDICINE.

A FEW weeks ago some account was given here of a lecture by Dr. Louis Sambon, in which he proposed the establishment of a floating school of tropical medicine. The general idea would be to charter a boat, and equip it suitably to make voyages with classes of students in tropical medicine to the West India islands. Dr. Sambon had previously brought his scheme to notice in Italy, where it won the support of the Italian Government and the Colonial Institute of Naples; and in France, where the Faculté de Médecine approved it, and where there is hope that Government assistance may be obtained. At a meeting in London last week a committee, with Dr. Andrew Balfour, C.B., C.M.G., as chairman, was appointed to consider the advantages that might be anticipated were such a scheme carried out and its probable cost. It would seem that the first duty of the committee will be to define the scope and purpose of any proposal made. Sea-going expeditions to the West Indies, or other places where tropical diseases prevail, might be concerned primarily with research, the staff including senior students. This was the thought that seems to have inspired some remarks Dr. Balfour made in the third report of the Wellcome Tropical Research Laboratories, Khartoum. He there suggested the provision of a well equipped laboratory in a vessel of from 800 to 1,000 tons, carrying a staff of the best students in tropical medicine of any year. The trip would be a prize of diligence and ability, and in such a laboratory both tutorial and research work could be conducted during the voyage. A vessel of the size suggested would be able to visit any portion of the globe, could ascend large navigable rivers, and would be the means of bringing back valuable material both for museum and teaching purposes. The latter is a matter of importance. The need of specimens for demonstrations was urgent both in London and Liverpool nine years ago, and it is still greater now. Both schools have sent research expeditions abroad, which have carried out many important researches on the spot, but it is not easy to maintain the supply of class specimens. Biological work of the kind was done by the *Challenger* expedition, and the Prince of Monaco maintains a yacht equipped with a laboratory for oceanographic research. Dr. Balfour stated that the small floating laboratory the Khartoum school maintained on the Nile had proved very useful, and we believe that Dr. Leiper has done a great deal of collecting on native boats in the rivers of Southern China. Dr. Sambon's idea seems to be rather different, for we gather that he would look upon the ship chiefly as a means for bringing students periodically into the tropics to study diseases in their natural habitats. The work apparently would be done on shore and not on the ship; he has, too, a secondary purpose in view, for he hopes that the visits of the classes with their teachers would stimulate the efforts of local authorities to improve the sanitation, and lead eventually to a pathological survey, of the Lesser Antilles. Both Dr. Balfour and Dr. Sambon are agreed as to the advantages of visits to hospitals and laboratories in the tropics. The former states that it is on the littorals of tropical countries that many important diseases occur, and suggests that in the event of epidemics the infected places might be speedily visited and perhaps materially aided. At all times the collection of specimens would form an important duty of the floating laboratory or school. Specimens could be brought back in good condition for teaching purposes at home, diseases could be studied on the spot, and parasites observed in a living state. The laboratory ship of Dr. Balfour's dream could be used for the study of zoology (especially economic entomology), botany, geology, and hygiene, all subjects more or less intimately connected with tropical medicine. To sum up, his idea would seem to be that practical experience should follow the theoretical foundation laid in a tropical medical school, and there is much to be said for it. Either scheme would cost a good deal of money, but the Colonial Office might properly be expected to contribute.

THE MUSEUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE annual report of the conservator of the Royal College of Surgeons of England relates the steps that are being taken to restore to their proper places the contents of the museum removed to the cellars and protected corridors in the basement when London was under aërial bombardment. On three occasions bombs were dropped in the neighbourhood of Lincoln's Inn Fields, but save slight damage from stray fragments of shell, the museum escaped unscathed. During the later years of the war much of the space of the museum was given up to the exhibition of war specimens. Altogether, down to the date of the armistice, 3,893 specimens had been received from military hospitals, all duly numbered and registered, and their histories collected and indexed. Over 1,200 had been examined, prepared, mounted, described, and placed on exhibition in the museum. A considerable number of the specimens were received on behalf of the Canadian and Australian forces. By the beginning of March last those belonging to the Australian Government had been packed under the supervision of Major Inglis, A.A.M.C., and shipped to Melbourne; a little later the Canadian specimens were shipped to Montreal by Captain Moreton Hall, C.A.M.C. The national collection belonging to the Royal Army Medical Corps is for the present retained in the museum and in the storerooms. Before the museum can be restored to its former purposes the destination of this national war collection must be settled. Pending a final decision one of the large rooms will be devoted entirely to such war specimens as are already mounted and described. Two other rooms will revert to their former purpose—the exhibition of specimens illustrating human anatomy and human pathology. Besides the war specimens prepared for exhibition by Professor Shattock and Mr. Cecil Beadles, there are still many hundreds of specimens in storerooms awaiting examination and preparation, which will involve the expenditure of a great deal of time, labour, and skilled technique. Professor Keith pays a special compliment to the skill shown by Mr. Beadles in the preparation of these specimens. Progress has been made in the restoration of the ordinary specimens, and the physiological and gynaecological series are already in place.

The anatomical and pathological specimens will be replaced during the present summer. It is hoped that by October the skeletons will have been attended to and the entire collection, with the exception of the teratological series, again made available for study. The space at disposal is being increased by the conversion of a basement room into a part of the museum, and to it the skeleton of the great Greenland whale, which formerly occupied a central place in one of the rooms on the ground floor, will be removed. In his report on the pathological department Professor Shattock enumerates the specimens presented during the year. Mr. Alban Doran reports considerable progress in the preparation of the descriptive catalogue of the collection of surgical instruments, to which many additions have been received, including a number of instruments belonging to the late Mr. Arthur Durham, among which were specimems from the surgical outfit of Mr. Aston Key and Mr. John Hilton, and the autolaryngoscopic mirror given by Señor Garcia to Mr. Durham. Sir Robert Jones has presented the instruments and apparatus invented and employed by his uncle, the late Mr. H. O. Thomas, including, in addition to the splints and appliances so well known by his name, a large hypodermic syringe used in the treatment of intestinal obstruction, a special two-way aspirator for the removal of fluid from the joints, and a set of singular instruments used by Mr. Thomas in cutting for stone. Mr. Stephen Paget has presented the microscope made by Andrew Ross about 1860, which was used by Sir James Paget during his pathological and physiological investigations.

ACCESSORY FOOD FACTORS.

THE Committee on Accessory Food Factors, appointed jointly by the Medical Research Committee and the Lister Institute, has issued a memorandum on the importance of accessory factors in food. The memorandum, which is signed by the chairman, Professor F. G. Hopkins, and the secretary, Dr. Harriette Chick, has been compiled in order to afford practical help to those occupied in the administration of food relief in the famine-stricken districts of Eastern Europe. It discusses the distribution and properties of the accessory factors, the antineuritic or anti-beri-beri factor (water soluble B); the antirachitic or growth factor (fat soluble A), and the antiscorbutic factor. Passing lightly over the antineuritic factor, the memorandum states that evidence is accumulating that rickets is caused by a shortage not of fat as such but of the fat-soluble growth factor, which is contained in certain fats only. It is absent from vegetable oils or present only in negligible amount, and is absent also from lard. It is present in notable quantities in cream, butter, beef fats, fish oils, such as cod-liver oil, and egg yolk. To prevent rickets in infants and young children, should full cream milk be unavailable, or its use thought inadvisable owing to risk of infection, the best sources of this factor are full cream dried milk or full cream unsweetened condensed milk. The dried milk is preferable to the condensed milk, but if either is used an extra antiscorbutic should be given. Green leaves are a cheap source of the fat-soluble vitamine. The loss in ordinary cooking is not serious, and adults can probably maintain good health when animal fats are replaced by vegetable fats provided green-leaf vegetables are consumed in fair quantity. To infants or very young children the juices expressed from cabbages and other green-leaf vegetables—raw or after steaming, but not boiling, for a few minutes—may be given, as also a teaspoonful a day of purées prepared from cooked spinach or lettuce. Pregnant and nursing mothers should have as liberal a supply of the fat-soluble factor as possible. It is thought that xerophthalmia may be due to want of it, and it is advised that, should this condition, or rickets or growth failure exist, a daily dose of cod-liver oil ought to be regarded as essential, in addition to all other procedures. For the prevention of scurvy the use of germinated seeds is advised. The seeds should be soaked in water for a day and kept moist with access of air for one to three days more, by which time they will have sprouted. It is the sprouted material which possesses antiscorbutic value. It should be cooked in the ordinary way, but for as short a time as possible. The richest sources of the antiscorbutic factor are cabbages, swedes, turnips, lettuce, watercress, lemons, oranges, raspberries, and tomatoes. Potatoes, carrots, French beans, beetroot, mangolds, and lime juice are inferior. The antiscorbutic factor is destroyed by heat, drying, or other methods of preservation, and all tinned vegetables and tinned meat are deficient in the antiscorbutic principle. The acidity of fruit increases the stability of the accessory factor, and to some extent prevents its destruction during the sterilization by heat and subsequent storage of tinned fruits. Artificially nourished infants should receive an extra antiscorbutic. Cow's milk, even when raw, is not rich in the antiscorbutic factor, and this is still further reduced by heating, drying, and preservation. The most suitable antiscorbutic material is fresh orange juice, 1 to 3 or 4 teaspoonfuls daily, according to age. Raw swede juice is said to be a potent antiscorbutic and an excellent substitute for orange juice. The clean cut surface of the swede, or if that is not obtainable, of the turnip, is grated and the pulp squeezed in muslin. Inquiries may be addressed to the Secretary of the Committee at the Lister Institute, Chelsea, S.W.1.

INTERNATIONAL PRIORITY.

IT may at some time be found possible to constitute an international medical tribunal before which claims to priority in medical and scientific discoveries might be discussed and adjudicated upon. At present each nation grabs the credit for its respective children. For instance, was exophthalmic goitre first described by Graves or—as the French name for the disease would imply—by the American Basedow? Did Wassermann really elucidate the test of the deviation of the complement known by his name or was it really to Dr. Bordet that the achievement should be attributed? As we showed some years ago, Bordet's claim to priority is clear. Nobody, so far, has laid claim to priority over Roentgen in the matter of x rays, but Ehrlich's claim to having discovered arsenobenzol is challenged by Armand Gautier and, incidentally, by Dr. Mouneyrat. In France antidiphtheria serum is currently known as Roux's serum and the hypodermic syringe which serves for the injection as Roux's syringe, ignoring Professor Behring altogether. We might get to hear something about Dr. Pravaz, who has given his name to the ordinary hypodermic syringe, at any rate in France. The man who introduces a new instrument into his country often gets the credit for having invented it, and the same remark applies to novel methods of treatment. It would save some confusion and much heart-burning if these matters were properly cleared up, so that Caesar should be credited with what belongs to him.

THE CIVIL LIST PENSIONS.

AMONG the recipients of Civil List pensions during the year ended March 31st, 1919, is Lady Turner—"in view of her late husband's, Sir George Turner's, services in the investigation and prevention of rinderpest, and in consideration of his death through contracting leprosy in the public service." Sir George Turner, M.D., became medical officer of health for Cape Colony in 1895, and as the result of his investigations a severe epizootic of rinderpest was stamped out by his method of simultaneous inoculation with virus and serum. For seven years he worked devotedly at the Pretoria leper asylum, and thus contracted leprosy. He resigned his appointments in South Africa in 1908, and spent the remainder of his life in Devonshire. On the direct initiative of the King the honour of knight-

hood was conferred upon him in 1913, two years before his death. Mrs. Harrison is granted a pension of £50, "in consideration of the services rendered by her late husband, Colonel W. S. Harrison, in connexion with inoculation against enteric and typhoid fevers, at considerable risk to his own health." Lieut.-Colonel William Sandilands Harrison, R.A.M.C., died in 1915 at the early age of 43. He did valuable research work while assistant professor of pathology at the Royal Army Medical College, and shortly before his death was appointed professor of tropical medicine. Pensions are also granted to the widow of Professor A. E. Mettam, President and professor of pathology and bacteriology in the Royal Veterinary College of Ireland; and to Miss Helen Tichborne, in view of the late Professor Tichborne's discoveries in chemistry and pharmacology.

Medical Notes in Parliament.

National Insurance Bill.

THE INCOME LIMIT.

THE National Insurance Bill to raise the income limitation of insurance for non-manual workers from £160 to £250 per annum, was taken in standing committee of the House of Commons on July 16th, Mr. T. P. O'Connor in the chair. Only one amendment was moved; this was by Major Farquharson, to provide that

Nothing in this Act shall be construed as entitling to insurance benefit any person employed otherwise than by way of manual labour who at the date of the coming into operation of this Act is not an insured person and whose income exceeds one hundred and sixty pounds per annum, and that any such person claiming to be entitled to insurance benefits shall make a declaration accordingly.

The case for the bill as presented last week was that, unless the higher income limitation were established, between half a million and a million insured persons whose wages or salaries had been raised to meet the increased cost of living would be cut out of the Insurance Act. It was admitted, however, that the new bill would bring into the scope of possible insurance a number of persons, roughly estimated by Major Astor at 20,000, whose income at the time of the passing of the last Act was above the limitation then fixed. Dr. Farquharson's amendment was designed to strike at this defect of the bill, but Major Astor, on behalf of the Government, said that it was impracticable and that all that could be done had been done to meet the case of the medical profession. In the end the amendment was rejected by 18 votes to 3.

Money Resolution.

On report on the Money Resolution for the National Insurance Bill, on July 11th,

Mr. Hogge said it seemed anomalous that while the income tax began at a basis of £130 the Government should raise the rate at which persons should be brought under the National Insurance Act from £160 to £250. He did not wish to argue whether £160 or £250 was a proper limit, but obviously the proposal was brought forward because of the rise in wages and food prices—temporary reasons—and he wished to know whether it was the intention of the Government permanently to draw the insurance line at £250, because, if so, it would alter the whole conception of national insurance.

Mr. Tyas Wilson, speaking as a Labour member, was not sure he agreed with Mr. Hogge's suggestion that as the rise in prices was reduced wages would come down to pre-war level. He thought there was a disposition amongst those he had met in favour of the present proposal. But if wages came down it might be necessary to reduce the income limit.

Major Hurst said that the effect of the bill would be to bring in two large classes—first, the class who had never been under the National Insurance Act before, and secondly, those whose rises in wages during the last few years had carried them beyond the present limitation. He felt certain that neither of these classes had expressed any opinion as to whether they wanted to come under this provision or not.

Dr. Addison said that all the care that could be taken to consult the representative societies concerned was taken before the proposal was submitted to the House. The new classes which might be brought in were entitled individually to claim exemption. The proposal was brought forward because, owing to the increase in wages, between half a million and a million persons who had paid their contributions regularly under the Insurance Act would be automatically deprived of any benefit which might arise from their contributions. It was therefore necessary to increase the wage limit. As to whether the proposal was temporary or not he could not say anything very definite. He was inclined to agree with Mr. Wilson that there was no reason to suppose there would be a return to pre-war level. It was true that the bill revealed nothing of a temporary nature, but it provided that those not hitherto included should have the right to contract out. The terms of the bill were very generous, and it could be amended in Committee to suit any particular cases. They might leave to the discretion of future Parliaments any action that might be thought necessary if the general rate of wages altered.

The resolution was agreed to.

Date of Termination of the War.—Dr. Addison informed Sir Kingsley Wood, on July 10th, that the National Registration Acts would expire on the date of the termination of the war. The date, as soon as it had been determined by an Order in Council, would be made known to local registration authorities. These authorities were, in the meantime, being informed that all duties under the Act might properly be suspended. It may be added that the Act passed last November provides that His Majesty in Council may declare what date is to be treated as the date of the termination of the present war, and the date so declared shall be as nearly as may be the date of the exchange or deposit of ratifications of the treaty or treaties of peace. Further, an Order in Council may similarly declare what date is to be treated as the date of the termination of the war between this country and any particular state.

Ministry of Health: Consultative Councils.—Mr. W. R. Smith asked the Minister of Health, on July 10th, whether, having regard to the importance of matters relating to the hygiene and health of animals used for human food, the provision of milk from cows free from tuberculosis, and the diseases of animals communicable to man, he would consider the advisability of putting at least one veterinary surgeon on every consultative council to be set up. Dr. Addison replied that the suggestion would be borne in mind in considering the composition of councils or special committees dealing with medical or sanitary administration, but he could not agree that such an appointment would be desirable in the case of every consultative council to be set up under the Ministry of Health.

Death after Arsenic Treatment for Syphilis.—Mr. Waterson asked, on July 4th, whether the Ministry of Health was taking any action in regard to the recent death of a girl in St. George's Hospital while undergoing treatment for congenital syphilis; and whether there had been a crop of such cases at Cambridge and Dublin during the war. Major Astor, in a written reply, stated that the case was under inquiry by the special committee appointed by the Medical Research Committee to investigate the results of the treatment of syphilis by salvarsan and its substitutes. The drug used was novarsenobillon, which is one of the drugs approved by the department for the treatment of syphilis, and tested under arrangements made by the Medical Research Committee. The coroner's finding at the inquest on this case was that this drug was properly administered and in proper amount. There had been several fatal cases following though not necessarily caused by the administration of these drugs in military hospitals at Cambridge and Dublin during the war, and these cases also were under investigation by the special committee. No precise information was at present available as to the number of deaths which had occurred in England and Wales since the beginning of the war, but the total number was of course very small, especially in proportion to the very large number of injections of such drugs taking place daily.

Tuberculosis Cases in London.—Replying to Mr. Freeman, on July 14th, Major Astor said there were approximately, so far as the County of London was concerned, some 1,700 persons, including children, in residential sanatoriums, and 500, of whom more than half were children, awaiting admission. Steps were being taken to increase the accommodation, including the adaptation of buildings that were provided for war purposes, so far as these were suitable.

Tuberculous Discharged Soldiers.—Mr. Devlin asked a question as to discharged soldiers suffering from tuberculosis who were unable to procure employment, as no employer wanted consumptive workmen, and inquired whether these men would therefore be allowed the full 100 per cent. disablement pensions to help them to exist during the few years they might expect to live. Sir James Craig said the question of tuberculosis as affecting discharged soldiers had recently been considered in all its aspects by an Inter-Departmental Committee. Its report, which was expected within the next fortnight, would be immediately taken into consideration.

Improvements in Artificial Limbs.—In reply to Sir Donald Maclean, who asked whether the Pensions Minister would publish in the daily press photographs or sketches of the latest improvements in artificial limbs for the information of disabled men, Sir James Craig said the Ministry would consider how far it would be practicable. Arrangements were being made to exhibit at repair dépôts the various artificial limbs available, so as to give a choice of limbs within limits approved by the surgeons to the disabled men. A list of repair dépôts would be published.

The Scottish Board of Health.—Mr. Munro (Secretary for Scotland), on July 14th, in answer to Mr. Macquistin, stated that the Scottish Board of Health had been duly constituted, with powers duly exercisable as from July 1st. Until the personnel was complete only duties of routine kind had been discharged.

Antitetanic Serum.—In reply to Mr. Gilbert, who asked as to a rider by the jury at an inquest conducted by Dr. Waldo recommending that antitetanic serum should be supplied to medical officers of health, Dr. Addison said that steps were being taken in this direction.

MEDICAL BOARDS OF THE MINISTRY OF PENSIONS.

MEDICAL practitioners wishing to serve on the Boards of the Ministry of Pensions, and especially those who have had practice and experience in the diagnosis and treatment of war diseases, such as trench fever, dysentery, malaria, etc., are requested to communicate with the Commissioner of Medical Services of the region in which they reside. We are informed that the remuneration will be one guinea per session of two and a half hours for ordinary members of the Board and two guineas per session for specialist members of the Board.

The names and addresses of the Commissioners and the boundaries of their regions are given below:

London and South-Eastern Region: Dr. H. J. Neilson, Hotel Windsor, Victoria Street, S.W.1. Boundaries: The City of London and Metropolitan Police Districts, and the Counties of Kent, Surrey, and Sussex.

Eastern Region: Dr. T. Basil Rhodes, 80, Westbourne Terrace, Paddington, W.2. Boundaries: Norfolk, Suffolk, Cambridgeshire, Oxfordshire, Huntingdonshire, Bedfordshire, Berkshire, Buckinghamshire, Northamptonshire, Leicestershire, Rutlandshire, Hertfordshire, and Essex (except the portion of the two latter included in London and South-Eastern Region).

South-Western Region: Dr. J. Young, 5a, Union Street, Bristol. Boundaries: Gloucestershire, Wiltshire, Dorset, Somerset, Devonshire, Cornwall, Hampshire, Isle of Wight.

West Midland Region: Dr. F. R. Hill, Queen's College, Paradise Street, Birmingham. Boundaries: Staffordshire, Shropshire, Herefordshire, Worcestershire, and Warwickshire.

East Central Region: Dr. Gibbs Lloyd, Acting Commissioner, Basinghall Buildings, Basinghall Street, Leeds. Boundaries: Yorkshire (except the Cleveland district on the north which is included in Northern Region, Middlesbrough area), Derbyshire (except district included in Chester (new)), Nottinghamshire, and Lincolnshire.

North-Western Region: Dr. A. H. Williams, 1, North Parade, Deansgate, Manchester. Boundaries: Lancashire, Cheshire, Isle of Man, and portion of Derbyshire embracing Glossop and New Mills.

Northern Region: Dr. W. Lloyd Reade, 47, Pilgrim Street, Newcastle-on-Tyne. Boundaries: Northumberland, the town of Berwick, Durham, the Cleveland district of Yorkshire, Cumberland, and Westmoreland.

Welsh Region: Dr. Bickerton Edwards, 30, Park Place, Cardiff. Boundaries: The whole of Wales and Monmouthshire.

Scottish Region: Dr. G. H. Gibson, 59, Cockburn Street, Edinburgh. Boundaries: The whole of Scotland.

Irish Region: Dr. D. A. Carruthers, 41, Upper Fitzwilliam Street, Dublin. Boundaries: The whole of Ireland.

THE BRITISH FEDERATION OF MEDICAL AND ALLIED SOCIETIES.

A MEETING of the Medical Parliamentary Committee was held at the College of Ambulance, Vere Street, London, on July 11th. Dr. ARTHUR LATHAM presided over an attendance of about forty-seven representatives of medical and other societies interested in national health.

The CHAIRMAN stated that Sir Watson Cheyne had for physical reasons resigned his membership of the Committee, but his departure indicated no difference of opinion.

Dr. N. HOWARD MUMMERY, honorary Organizing Secretary *pro. tem.*, read a list of forty-seven societies which had signified their willingness to be represented on the Committee. Other bodies had not yet had an opportunity of consulting their members or had waived the matter for the present. The Council of the British Medical Association had decided not to be represented, but this decision was subject to the approval of the Annual Representative Meeting.

The CHAIRMAN said, in reply to two representatives who asked whether the new organization was in opposition to the British Medical Association, that there was no opposition on the part of the Medical Parliamentary Committee. A number of members of the British Medical Association and of its Council were in favour of joining forces, and he still hoped that the co-operation of the Association would eventually be secured.

The report of a subcommittee estimated the annual expenditure of the Committee (including the salaries of organizing secretary, clerk, and lobby correspondent) at £2,092. The subcommittee suggested that the title of the organization should be altered to "The British Federation of Medical and Allied Societies," and that it should be an incorporated association, limited by guarantee, under the Companies' Acts, 1908–1917, and registered under the Board of Trade (Section 20) with limited liability, but without the word "limited" after its name. Its Council should consist of representatives of affiliated and allied bodies and co-opted members, and an executive committee should transact its ordinary business.

The CHAIRMAN explained that the reason for the suggested change of name was that the title "Medical Parliamentary Committee" had given rise to such frequent misunderstandings. The change of name did not indicate any change of policy. Sir RONALD ROSS moved that the title be "The British Federation of Medical and Allied Societies," and this was unanimously agreed to.

After some discussion on finance it was decided to leave it to the Executive Committee to draw up a financial scheme and submit this to the various societies with a request for their opinion before the next meeting.

The following nominations were then submitted from the chair for the Executive Committee:

Chairman: Sir Malcolm Morris.
Vice-Chairmen: Dr. Arthur Latham, Dr. E. H. M. Stancomb.
Honorary Secretary: Dr. Charles Buttar.
Honorary Treasurers: Sir Thomas Horder, Dr. Gordon Dill.
Executive Committee: Dr. Rashell Davison (Association of Medical Officers of Health), Dr. H. J. Cardale (Association of Panel Committees), Mr. C. F. Rilot (British Dental Association), Sir Ronald Ross (British Science Guild), Mrs. Bedford Fenwick (Central Committee for State Registration of Nurses), Mr. Comyns Berkeley (College of Nursing, Limited), Dr. Frank Coke (Medico-Political Union), Miss Rosalind Paget (Incorporated Midwives Institute), Dr. Jane Walker (Medical Women's Federation), Dr. R. H. Cole (Medico-Psychological Association), Mr. E. B. Turner (National Council for Combating Venereal Diseases), Dr. Edwin Smith (National Medical Union), Mr. Rowsell (Pharmaceutical Society of Great Britain), Professor E. H. Starling (Physiological Society), Dr. A. Withers Green (Poor Law Medical Officers' Association), Dr. W. Pasteur, C.M.G. (Royal Society of Medicine), Dr. Mary Chalmers Watson, C.B.E. (Scottish Union of Medical Women), Dr. Halliday Sutherland (Tuberculosis Society), Dr. Squire Sprigge, Dr. Arthur Shadwell.

Representatives of the National Association for the Prevention of Tuberculosis and the British Postal Medical Officers' Association put forward claims for their respective bodies, but it was agreed, on the motion of Sir RONALD ROSS, to adopt the list as it stood, on the understanding that with the growth of the Federation it would be possible to make the Executive Committee more inclusive.

It was announced that the office of provisional organizing secretary had been accepted by Dr. N. Howard Mummery, who was serving in an honorary capacity until the Executive Committee could be got together.

England and Wales.

HOUSING IN LONDON.

THE Housing Committee of the London County Council has presented a scheme to provide 29,000 new houses, to accommodate approximately 145,000 persons, within five years. The total capital expenditure will be about 31 millions, including a little over 5 millions for slum clearances and rehousing. An economic and remunerative rent is not expected; it is, in fact, estimated that the annual deficit on the first 10,000 cottages will be nearly half a million, or on each cottage from £45 to £48 a year, according to the number—20 or 15—to be provided to the acre. On the remaining 19,000 cottages the deficit is expected to be about £600,000, or from £30 to £33 a year on each cottage. To this is to be added the annual deficit of over £100,000 on block dwellings to be provided for rehousing in connexion with the clearance of insanitary areas, which cannot be undertaken before some progress is made in the provision of new accommodation elsewhere. The ultimate annual deficit when the scheme is completed is estimated to be one million and a quarter. The Finance Committee pointed out that the rents on which the estimates were based were less than half the remunerative rents, so that the other half would have to be borne by public funds. The committee expressed the opinion that from a general financial point of view it is undesirable that so large a proportion of the cost should fall on public funds. The proposal, however, was approved, and over half a million is to be expended immediately on the erection of 650 cottages and two shops.

DR. CAMPBELL OF BRADFORD.

Dr. H. J. Campbell, who twenty-four years ago went from Guy's Hospital to be physician to the Bradford Infirmary, has resigned that office, and is retiring from practice. On July 4th he was entertained by the medical practitioners of Bradford and all parts of the surrounding district at a complimentary dinner. The chair was occupied by Dr. Kitchin, president of the Bradford Medico-Chirurgical

Society, and after dinner Dr. Rabagliati made a presentation on behalf of many subscribers. He said that the departure of Dr. Campbell was a matter of great regret to all who had been associated with him and had had opportunities of estimating the excellence of the work he had always done. Some years ago Dr. Campbell had said to him that in a consultation there were three things to be considered: First, the good of the patient; secondly, the position of the family doctor; and thirdly, the position of the consultant. Throughout his life in Bradford Dr. Campbell had always followed out this rule, ever considering the patient first. Dr. Campbell in his reply said that he had always endeavoured to be loyal to those with whom he was associated, and they had always been loyal to him. He thanked the givers most warmly for the handsome presentation, but still more for all the kindness and consideration they had always shown him. Dr. Campbell has been an active member of the British Medical Association, as secretary and treasurer of its Yorkshire Branch, as a member of the Central Council, and as chairman of the Hospitals Committee. During the war he was visiting physician to the War Hospital and chairman of the Local Medical Committee. All through his career in Bradford he showed an interest in the life of the city outside medical work, in art and literature, and in all matters connected with health, and had served upon a number of committees. He will be much missed by his colleagues and the public in Bradford.

Scotland.

CHAIR OF CLINICAL SURGERY, EDINBURGH.

SIR HAROLD STILES has been appointed Regius Professor of Clinical Surgery in the University of Edinburgh, in succession to Mr. F. M. Caird. His selection by the Crown will command universal approval. He was born in England, but has been identified with Edinburgh all his working life. He was the most brilliant scholar of his year, and won many academic distinctions. Most of his work has been done at the Royal Edinburgh Hospital for Sick Children, but he is also surgeon to the Chalmers Hospital. During the war he did a great amount of military work and is inspector of military orthopaedics in Scotland. When the Army Medical Advisory Board was reconstituted he was appointed a member along with Sir Berkeley Moynihan, Sir Robert Jones, Sir Bertrand Dawson, Sir Havelock Charles, and Sir W. H. Horrocks. He holds the rank of colonel in the army and received the honour of knighthood last year.

SIR THOMAS FRASER.

Sir Thomas Fraser, who recently resigned the Chair of Materia Medica in the University of Edinburgh, was on July 11th presented by colleagues and friends with his portrait, a three-quarters length painted by Mr. Robert Home. Sir Thomas Affleck, in making the presentation, said that from the beginning of his career Sir Thomas Fraser's work had marked him out for great things; this promise was early fulfilled, so that when in 1877 he was called to succeed his eminent master and friend, Sir Robert Christison, the medical world felt that the right man had been chosen. His work had shed lustre upon the university, and in the Royal Infirmary he had proved himself a clinical teacher of the first order; thousands of his former pupils in all parts of the world were now practising those precepts of thoroughness, accuracy, and honesty in the investigation and treatment of disease, of which he himself was so conspicuous an example. Sir Thomas Fraser, in expressing his thanks, said that during his tenure of forty-two years he had shared in the training of between 6,000 and 7,000 men, who constituted as a body the best qualified practitioners of medicine and surgery in the British empire. The high professional value of original research in all departments of medicine had been recognized during the last twenty years, whereas at the time of his appointment there was an almost total want of provision in respect of accommodation and equipment. Of the researches in which he had engaged he mentioned especially that with regard to the alkaloid of physostigma, the first substance found to contract the pupil, and now in every-day use by the ophthalmologist. On the previous day, as noted in the column of university intelligence, Sir Thomas Fraser received the honorary degree of LL.D. from the University of Edinburgh.

Correspondence.

RECONSTRUCTION OF THE TERRITORIAL MEDICAL SERVICE.

SIR,—I had hoped that the excellent article on the future of the Territorial Medical Service, in the BRITISH MEDICAL JOURNAL of May 3rd, would have aroused some interest amongst R.A.M.C. readers. So far no responses are forthcoming. It is sincerely to be hoped that the various points to which your "well informed correspondent" drew attention will not now be lost sight of, especially in view of the fact that the War Office has called a Committee of R.A.M.C.(T.F.) Officers to make recommendations for the reconstruction of the medical services of the force, and that the British Medical Association has appointed Major E. G. Annis, R.A.M.C. (T.F.), to attend the meetings as representative. The drawing up of a "General List" in August, 1918, was a step in the right direction, but I think the principal weakness in the old Territorial Force Medical Service was ascribable, partly to the method of training, which was that of the particular unit the officer belonged to, and partly to the system, by which officers were posted to a particular unit, and seldom or never moved from it, during all their service. Most Territorial officers when they took a commission were relegated to a unit, where they remained during all their service—in fact would have remained there still if the war had not come along and jolted things up a bit.

One good thing the war did was to move officers about more freely amongst variously constituted units on the different fronts, so that they received in war time a training which they should have received in peace times. For example, your correspondent says—and rightly, too—that "the Territorial Regimental M.O. was a 'backwater man' with very little opportunity for training, and practically no executive experience, and so was retarded in promotion." This was evidently the view taken by Mr. Churchill's committee, to judge from their report, after they had inquired into the system of promotion in the R.A.M.C.(T.F.); but your correspondent might also have added that, even when Territorial Regimental M.O.'s had made themselves efficient in executive work and demonstrated their proficiency therein by passing examination D for promotion (from Major to Lieutenant-Colonel), they were still "held up," or, rather, "turned down."

What is required in the new T.F. Medical Service is a good all-round training for officers. Part of that training might be during their student days at the universities and hospitals, but during the annual training an officer should not go year after year to the same unit and go through the same routine. He should be shifted about and made competent to act in any unit, whether as Regimental M.O., or with a field ambulance or casualty clearing station. Due attention should be paid to hospital work (clinical and administrative) and to sanitary duties.

If the training were developed on the "all round" lines I have indicated, the service would be vastly improved, and it would be found on mobilization that officers would be more easily posted to duties suitable to their capacities, there would not be so much attempting to fit square bolts into round holes! Any one can understand what I mean if it ever was his lot to see a highly trained scientific gynaecologist delving for fragments of a high explosive shell in the deep lumbar muscles—an occupation at which he looked, and, I have no doubt, felt, as much at home as a mermaid in a hayfield! No, Sir, what is required is a universally adaptable bolt to fit any hole, guaranteed reliable in all climates and under all conditions. It would be helpful to see discussed in these columns the experiences and suggestions of Territorial officers who have served on the various fronts.—I am, etc.,

June 30th. TERRITORIAL FORCE.

MEDICAL AND SURGICAL DIRECTORATES FOR THE ARMY MEDICAL SERVICE.

SIR,—Those interested in the development of the Military Medical Service will read with great satisfaction of the appointment of directors of hygiene and pathology in the Army Medical Department.

The initiation of the scheme for the creation of these

directorates is no doubt made possible at this time by th fact that the two very distinguished officers who have been appointed directors have been permitted to "carry on" in their respective specialties, instead of being switched into the usual channel of advancement in administrative posts.

To a civilian observer of medical and surgical arrangements during the war it seems strange that similar schemes for medicine and surgery should not have been brought into being at least *pari passu* with those for hygiene and pathology. Strange, too, that these two youngest born subjects, so to speak, should receive such preferment while the older should still be left under the thumb of administrative departments, which should be subservient to them!

While every one acknowledges the incalculable value of the work done by hygienists and pathologists in the prevention and cure of disease, yet the experience of the war showed how essential the advice and influence of specialists, represented by consultants and others, were. Sir George Makins, in the lecture published in the BRITISH MEDICAL JOURNAL on June 28th, has shown very clearly the part which consultants actually played in the war.

The creation of the directorates in hygiene and pathology will, without doubt, result in the best men rising to the highest ranks without having to desert the professional work in which they show greatest proficiency. There is no reason why the physician or surgeon should receive different treatment and be compelled to step into administrative appointments, in which the routine work usually depends on the efficiency of trained clerks, while unusual problems depend for their solution on common sense. Under present conditions, the professionally employed officer may be, and often has been, curtailed in good work by an unsympathetic administrative officer of superior rank.

Medicine and surgery require directorates as clamantly as did hygiene and pathology, and it is to be hoped that the Director-General is of this opinion and will set machinery in motion to establish them without delay.

The consultants in this war were virtually directors. As in war, so in peace a similar system should prevail. The hospital specialist would then have a channel of communication in connexion with his purely professional work through subdirectors to the chief director of the department concerned (medicine, surgery, hygiene, pathology, etc.), and should have a chance of promotion to the highest ranks on professional standing, instead of, as in the past, with extremely rare exceptions, on administrative capacity only. How often, during the war, was a man of high professional attainments diverted from his work to an administrative appointment which really required special training for proper performance!—I am, etc.,

Aberdeen, July 8th. H. M. W. GRAY.

KALA-AZAR IN MESOPOTAMIA.

SIR,—The very important question whether kala-azar may be contracted in Mesopotamia has been recently raised by Dr. Low[1] and by Dr. Hamill,[2] and while the latter offers a guarded opinion, the former considers, from the evidence adduced by him, that the question may be answered in the affirmative.

While in Baghdad, I lived with Dr. Low's case during the greater part of his stay in that city up to the time of his admission to hospital for the complaint, which was only definitely diagnosed in England six months later. He arrived in Mesopotamia about the end of July, 1917, after about four or five months' residence in India, during which he had been stationed in Bombay and Karachi and had visited Bangalore for a brief period. According to Dr. Low's statement the patient enjoyed good health till the following March (1918), and he was admitted to hospital in April. I cannot agree that the patient's health was satisfactory during the whole period of my stay with him (November, 1917, onwards). Though he was able for work, and indeed was a most energetic laboratory worker, he was constantly complaining of headaches, especially in the evenings, and he was troubled with a persistent hard cough of an asthmatic character. The possibility of a tuberculous basis was often suggested in conversation with himself and his colleagues. If these premonitory symptoms be regarded as evidence of specific infection acquired in India, the incubation period would work out at five or six months.

A history such as this would be quite common in kala-azar, and when one considers the generally insidious onset of this disease, short incubation periods can be satisfactorily determined only by actual demonstration of the parasite at a time when symptoms are probably too slight to suggest a specific infection with Leishmania or to warrant spleen or liver puncture.

In the spring of 1918 we had two proved British cases of kala-azar in Baghdad, one of which was diagnosed by Dr. Low's patient shortly before he himself was admitted to hospital. Another occurred since and was only diagnosed at autopsy, spleen puncture during life having been negative. One of these cases acquired his infection almost certainly in India. He had been invalided from Mesopotamia to India in October, 1916, and resided successively at Deolali, Lahore, Belgaum, and Bombay till the beginning of May, 1917, when he left again for Basra. He returned to his unit, and thereafter was continually reporting sick. "He did not feel fit for anything," but had no definite complaint beyond increasing lassitude. In November, 1917, he was admitted to a Baghdad hospital for malaria (unconfirmed), and in March, 1918, he was again admitted, when the true nature of the disease was revealed by liver puncture. The patient himself dated his illness from his stay in Belgaum. This case improved under antimony, and was sent down the line.

The second case, confirmed by spleen puncture in March, 1918, ended fatally in April. His condition on admission was serious. Though parasites had been very numerous in the liver juice taken during life, they were exceedingly scarce both in the liver and spleen after death—a circumstance which was attributed to the sterilizing action of the few doses of antimony administered. This man had arrived in Mesopotamia from Bombay about the end of May, 1917, but the official records make no mention of movements in India. I gathered from the patient, who was a regular soldier, that he had not resided in India, but had been in various parts of Africa. In this case the records of movements are unsatisfactory.

The third case, diagnosed only *post mortem*, had been, I understand, in India, but I have not yet obtained an official record of his movements.

My object in mentioning these cases is to submit that, before satisfying oneself that kala-azar may be contracted in Mesopotamia, one must have definite evidence of its occurrence among natives. My inquiries of civil surgeons lent no support to that view, but, naturally, one must wait until native diseases have been more carefully inquired into.

If kala-azar occurs in Mesopotamia, this country would form an exception to the rule that *L. tropica* and *L. donovani* do not prevail in the same geographical areas. The rule, however, I admit, is not absolute. I also admit that places I have mentioned, such as Lahore and Belgaum, are not generally regarded as kala-azar foci. On the other hand, I am informed by officers with Indian experience that sporadic occurrence of kala-azar in districts remote from Bengal, Assam, and Madras is not unlikely.

A Syrian bacteriologist who was taken prisoner at Kut, and who later did good service in a British laboratory in Mesopotamia, informed me that he had diagnosed a few cases of kala-azar by spleen puncture among Turkish soldiers at Kut, and that he had heard of many more cases among the Turks. I am inclined to believe that these Turks brought the infection with them from Asia Minor, a definite focus of *L. infantum*. The possibility also is not excluded that the British cases I have mentioned, who were all serving in the forward area, may have acquired their infection from a Persian or Caucasian source.—I am, etc.,

Lister Institute, London, July 10th, 1919. J. C. G. LEDINGHAM, Late Consulting Bacteriologist, Mes. Ex. Force.

[1] BRITISH MEDICAL JOURNAL, June 7th, 1919.
[2] Ibid., July 5th, 1919.

ACCESSORY FOOD FACTORS AND THE INTESTINE.

SIR,—I have read with great interest and appreciation Lieut.-Colonel McCarrison's article on deficiency of accessory food factors, and welcome any observations that may have bearing upon coeliac disease.

This condition, in which I have been interested for many years, and upon which I have seen *post-mortem* examinations made, both in the ascitic and non-ascitic stage, presents, among many problems, one which seems to me of outstanding interest. A child who has been thriving upon a milk diet suitable to an infant of the particular age, has, for example, an attack of bronchopneumonia or whooping-cough complicated by diarrhoea, and from that time we find ourselves in this dilemma: We stop the diarrhoea by restricting diet and by suitable drugs, and then, when we attempt to return by stages to a suitable diet, we find intolerance of milk and a return of diarrhoea, with passing of peculiar pasty stools and rapid wasting. We are perforce compelled to seek for some food or foods that can be tolerated, and are then met with the fresh obstacle that the moment we attempt to improve this diet from one of near starvation we find after a short interval of success another breakdown—more diarrhoea and more collapse. Further, the article of food that suits one case is harmful to the next, with the result that, however much we dislike it, we are forced to build up, by sheer experiment, a diet at once empirical and unsatisfactory. In the very severe cases I have been struck again and again by the mother's statement, somewhat to this effect: "I have learnt by bitter experience what you told me—that until I practically starved my child no signs of recovery would commence to show themselves." In a recent very striking case the mother, by weighing daily the food and faeces, anticipated the earliest sign of an outbreak of diarrhoea, and eventually there was an excellent recovery.

Here again we meet with a remarkable fact—that these children, many of them, begin to recover about the sixth year without any obvious reason. It is clear that during the long period of inadequate and often unbalanced diet many of the changes described by Colonel McCarrison might well arise as secondary events. Yet how are we to avoid these dangers? It would seem that in some children, whether on account of some peculiarity in constitution or in the original illness, there results a widespread destruction of nearly all digestive power. Yet not from any *gross* lesions, for there is apparently none in these cases of coeliac disease. We are left with the problem of finding out, in the circumstances of grave illness, what food can be tolerated and, of equal importance, how much. If we succeed in keeping body and soul together over a sufficient length of time the digestive powers begin to develop again and eventually all kinds of food may be taken; but so slow is the recovery and so prolonged the stage of partial starvation that secondary results, often of serious importance, are grafted on the original illness. In Colonel McCarrison's researches it may well be that we shall learn how to diminish these dangers.

While one thinks over these most interesting problems one cannot help recalling another well known and curious group of cases in infancy, in which a change of food produces for a short time an immediate improvement which quickly ceases, to be replaced by a downward step. I have no doubt that every doctor of any experience has been worried to distraction by these infants and must feel there is some peculiar character in this type of malassimilation.—I am, etc.,

London, W., July 11th. F. JOHN POYNTON, M.D.

HYPERPYREXIAL HEATSTROKE.

SIR,—I was much interested to read the article on hyperpyrexial heatstroke, in the BRITISH MEDICAL JOURNAL of April 26th last, and having had experience of such cases in a general hospital in Mesopotamia I feel prompted to make one or two observations in this connexion.

With regard to etiology, while I agree with Dr. Hearne regarding sequelae once "suppression of sweating" is established, I feel assured that this condition is brought about by the toxin of some primary morbid condition, and that "hyperpyrexial heatstroke" should not of itself be considered a disease.

Certain diseases, including malaria, have from time to time been suggested as causal agents, but there is another disease, both little understood and little respected, which is to my mind worthy of special consideration as an etiological factor, at least in Mesopotomia. I speak of sandfly fever, one of the most characteristic symptoms of which is a marked "suppression of sweating," and, given suitable atmospheric conditions, I consider the whole train of symptoms constituting the phenomenon of hyperpyrexial heatstroke to be peculiarly liable to develop during the course of this disease.—I am, etc.,

Baghdad, May 16th. H. C. SINDERSON, Captain R.A.M.C.(S.R.).

TOXIC SYMPTOMS FOLLOWING ASPIRIN.

SIR,—I have met with cases similar to that carefully recorded by Dr. W. A. E. Karunaratne in the BRITISH MEDICAL JOURNAL of July 12th. In my cases the patients have taken soda water or an alkali after the aspirin. We have long been warned of the risk of taking alkalis after aspirin. I usually advise patients to whom I prescribe aspirin *not* to take soda water or alkalis after this drug, and also emphasize the word "not," as in one case, on returning home, the patient forgot whether he had not to take soda water or to take it after the aspirin, and, after much hesitation, took the soda water and suffered badly from the toxic symptoms described by Dr. Karunaratne. It would be interesting to know, in the case he has reported, if soda water or an alkali had been taken after the aspirin, as it is a point of practical importance to learn if these symptoms are always due to the taking of alkalis after the drug, or to idiosyncrasy in some cases.—I am, etc.,

Manchester, July 12th. R. T. WILLIAMSON, M.D., F.R.C.P.

PREVENTION OF HYDROPHOBIA.

SIR,—It is reassuring to read in your article in the BRITISH MEDICAL JOURNAL of June 21st, on the prevention of hydrophobia, that you advocate the Muzzling Order being extended. As at present applied the regulations of the Board of Agriculture give the maximum of inconvenience to the owners of dogs in an infected area, with the minimum assurance of an early stamping out of the disease.

Although the penalty for smuggling dogs into England is severe, the drastic regulations as regards quarantine must tempt many owners of dogs to avoid it, and unless the military authorities are preventing this the smuggling of a dog with large parties of men returning from abroad must be a comparatively easy matter. There is the danger that these dogs may be taken to all parts of the country, the uninfected counties being naturally preferred by the owners, and no county can be excluded from this possibility. No mention is made in your article of the quarantining of dogs from infected parts of England; as the regulations stand at present no exception is made in the case of removing a dog from the outskirt of an infected district to the centre of another infected county, no proof of the impossibility of the dog being infected is accepted, and quarantine for six months on the premises of a veterinary surgeon approved by the Board of Agriculture is strictly enforced. The prohibition preventing me as a medical officer from isolating my own dog appears to me to be a reflection upon my training.—I am, etc.,

Devonport, July 12th. R. D. JAMESON, Surgeon Commander.

SUDDEN DEATH UNDER AN ANAESTHETIC.

SIR,—The correspondence in the JOURNAL concerning the risks of anaesthesia in tonsillectomy is most interesting and instructive.

As a general practitioner of twenty years' standing I thoroughly endorse Dr. Gunewardene's opinion that tonsillectomy is done far more frequently than is necessary. Almost daily I emphasize to mothers the importance of teaching their children the proper method of breathing.

It has often struck me that the operation is frequently undertaken at a too tender age. Only recently I called, in my capacity of public vaccinator, at a house for the purpose of vaccinating the baby, and was requested by the mother to call again at a later date as the baby was going to have its tonsils out. The child was 12 months old. As many cases of enlarged tonsils, with their accompanying disabilities, subside with time, care, and treatment, I always insist on seeing the child two or three times—say, at intervals of a few weeks or a month—before recommending tonsillectomy.—I am, etc.,

Birmingham, July 14th. ERNEST J. BEARDS.

SIR,—I have followed this discussion with much interest, and should like to endorse most cordially the very apposite remarks of my friend Dr. Blomfield in your issue of July 12th.

For the sake of the argument one may assume (though it is a very large assumption) that nearly all the fatalities occur during a stage of comparatively light anaesthesia. Even if one accepts this view, however, it does not really help us very much, for Dr. Levy cannot but admit that every patient who inhales chloroform must of necessity pass through such a preliminary stage. I rather gather that Dr. Levy claims for himself that he is able to curtail this stage, and to minimize the dangers to which he refers. But this is not enough; we want to be able to minimize the risks run by patients at the hands of anaesthetists who are less experienced and less competent than Dr. Levy, and from a rather exceptional and very large experience of this particular class I am firmly convinced that nothing short of giving up the use of chloroform by itself will do this. In short, I look upon Dr. Levy's teaching as retrograde rather than as a step in advance.

To those who are prejudiced against the use of ether pure and simple in these cases I would recommend a trial of the modification suggested by me in your columns of a few weeks ago (May 24th).—I am, etc.,

London, W.1, July 12th. J. FREDK. W. SILK.

SIR,—Whilst agreeing with Mr. Tilley and Dr. Rood that ether should be the main anaesthetic in the ether-chloroform sequence in the operation of removal of the tonsils, I venture to doubt whether it is the best anaesthetic for induction. The unpleasant odour and slow action of open ether are disadvantages both for the adult and the child.

It should be the endeavour of the anaesthetist to overcome them, whilst retaining the advantage which ether offers of being a safe anaesthetic. This can be done, either by preceding the administration by C.E. for the first two minutes, or by dropping or spraying ethyl chloride on the mask until the breathing becomes regular and then changing to open ether. The latter sequence is the more difficult, but is specially useful when dealing with the fractious, nervous, or highly-strung child. It is an advantage to drop a little eau de Cologne on to the mask at the beginning of induction.—I am, etc.,

London, W., July 5th. FRANCIS E. SHIPWAY.

SIR,—The question of anaesthetic in the removal of tonsils is most important. With the evolution of the pathological and etiological outlook, it is now practically established that sepsis of these lymphatic tissues must be held responsible for many grave arthritic and systemic infections. Since the only rational treatment for sepsis is efficient drainage or removal of the focus, we have passed on from tonsillotomy to tonsillectomy and enucleation by dissection as the only means of dealing surgically with certain types of sepsis-bearing tonsils.

The latter procedure in particular should be placed under the category of major operations for at least two all-sufficient reasons: (1) The degree of anaesthesia is equal in depth to that required for any abdominal operation; (2) the technique in many cases is difficult, requiring considerable experience and manipulative skill, and has to be carried out in a region where there may be many pitfalls of a serious nature. In my opinion it is easier to give a successful anaesthetic for many types of abdominal operation than it is for the enucleation of difficult tonsils.

If this method of operation is to become that most commonly adopted, I would unhesitatingly advocate the use of "open ether," and venture to say that in a few years its use will be as universal in this country as it has been for some years in America.

Personally, I find that once the anaesthesia is pushed sufficiently deep to cause the complete relaxation necessary for an abdominal operation, I have about eight or nine minutes in which to dissect the tonsils, without the use of any further anaesthetic, and this will prove ample for any surgeon experienced in this class of surgery, so for this reason I have dispensed with the use of Junker's apparatus for the past two years.

Atropine is strongly recommended by some anaesthetists and not at all by others, whom I regard as equally, if not more, skilful. I have met and worked with many of both schools, and must say that, as the surgeon, I am unconvinced as to its value in tonsil operations, and consequently I leave this matter to the anaesthetist's choice.—I am, etc.,

JOHN F. O'MALLEY, F.R.C.S.,
London, W., July 5th. Temporary Major R.A.M.C.

EFFICIENT TREATMENT OF THE CHRONIC RUNNING EAR.

SIR,—Captain Wilson's paper in the BRITISH MEDICAL JOURNAL of May 24th is surely of more than passing interest. The number of cases and the considerable time the report covers constitute a strong piece of evidence. The two principles enunciated—(1) cleanse by swabbing and avoid syringing, (2) avoidance of the mastoid operation—offer marked encouragement in aural treatment; (*a*) the treatment, though simple, is to be thorough, and then (*b*) no mastoid operation is required, save as a rare exception.

Probably others have noticed that the mastoid operation has, in a number of cases, not cured the discharge, and its violent and difficult character are marked features in its performance.

Personally I can appreciate fully the favourable results of simple treatment thoroughly carried out, so well and wisely recorded by Captain Wilson.—I am, etc.,

E. DUKE,
Hove, June 5th. Captain, late R.A.M.C.

INFECTIVE CATARRHS—SO-CALLED "COLDS."

SIR,—The recent proposal made in the correspondence columns of the BRITISH MEDICAL JOURNAL, to abolish the popular diagnosis of "chill" as a means of combating the idea that a "cold" is caused by cold, seems to me to be ill advised. Were it possible to educate our patients to use the term "infectious catarrh" instead of "chill," and to make them understand the significance of the word, there is no reason to think that a change of term would produce a change of habit. A busy man with engagements will keep them, even at the risk of infecting his friends. The fact that catarrhal diseases occur and take on an epidemic form with the first seasonal changes at the commencement of winter cannot be ignored. Apart, however, from the application of the word "chill" to catarrhal diseases, there are people to whom a sudden lowering of the temperature, especially if accompanied by a cold dry wind, is not only disagreeable but a source of illness. Most such persons are the subjects of mild septic poisoning, and will be found to be susceptible to any form of draught or north or east winds, of which they have great horror. This fear is well founded, for the lowering of the temperature checks the elimination of the poisons which are circulating in their blood, and produces illness. The septic foci producing this condition are found in various parts of the body. The commonest sites are the accessory cavities of the nose (rhinitis), the gums (septic gingivitis), the urinary tract (coli bacilluria), or even the kidneys when there is any deficiency in their action, such as may exist in gouty subjects.

After exposure to sudden cold, a person subject to these conditions feels ill (malaise), with a disinclination for exertion (mild neurasthenia), gets a nasty taste in the mouth (chill on the liver), often associated with biliousness or diarrhoea, and if suffering from rhinitis may experience an attack of asthma. For these symptoms he will take a hot bath and possibly send for his doctor, who will be informed that the patient has a "chill." The cause of truth will not suffer if the patient's diagnosis is accepted and further help rendered to restore the cutaneous excretion.—I am, etc.,

Sevenoaks, July 14th. JAMES E. BLOMFIELD, M.A., M.D.

INSURANCE TERMS AND CONDITIONS.

SIR,—Loss of liberty, the twenty-four-hour-day contract, is to me the most objectionable feature of insurance work; and if midwifery is to be added to this contract our serfdom will be complete.

Can we not put up a fight for freedom, declining any contract except for ordinary work, due notice of which is received before 10 a.m.? and if the Government wish to provide for emergency, night, or for midwifery, let them do so by means of coupons attached to each insured person's card and available for any doctor. If they are

made valuable enough, a patient will always obtain medical attention—in most cases from his own doctor. But the doctor will feel that he is free and can decline a night call or a midwifery contract when he wishes.—I am, etc.,

July 7th. GENERAL PRACTITIONER.

SIR,—It must now be obvious that this document (M. 25) is unacceptable to a large proportion of our members, and I would urge the Association to make radical alterations without delay.

The initial step should be to insist on the payment to every practitioner of a fixed and previously agreed sum for ordinary general attendance upon each person on his list.

The Commissioners, evidently obsessed by the idea of central and area pools, would talk of inflation, but that should be allowed for in determining the *per capita* sum. They have arrived at the number of insured persons; they can know the aggregate of names on practitioners' lists from the Insurance Committees, and so estimate the percentage of inflation to be allowed for in fixing this rate of payment. In the few localities where payment by attendance is the basis, the sum due at this fixed rate would of course be distributed from an area pool. Temporary residents should be paid for according to an agreed scale. There should be a definite addition to the capitation fee for rural districts to cover expense of travelling and loss of time. Any addition to or extension of the present range of service could then be arranged for either by separate payment or by an increase of the capitation fee.

In short, since the contract is between the authorities and each individual practitioner, so the payment should be a definite one to each practitioner, and no proportion or fraction of a general fund. It is obviously not the concern of panel practitioners whether the sum accruing from the sale of insurance stamps suffices or not. There is another Government department whose revenue is derived from the sale of stamps—the Post Office—but I cannot imagine its staff accepting as salary a variable fraction of a common pool, or being satisfied, when applying for an increase, with the assurance that for any increase extra duties must be performed.—I am, etc.,

Bourne, Lincs, July 14th. W. J. GILPIN.

SIR,—At a meeting held yesterday at Brighton to consider a report on the revision of conditions of service under the National Insurance Acts, Dr. Cox, speaking on behalf of the British Medical Association, stated that up to the present no negotiations had taken place between the Government and the Association as to increasing the rate of remuneration under the National Insurance Act.

However, I see in the BRITISH MEDICAL JOURNAL for this week that Major Astor stated in the House of Commons on July 3rd that "at the present moment and for some time past the department had been discussing with representatives of the medical profession the rates of remuneration for the future."

Perhaps Dr. Cox will explain the discrepancy? I cannot.—I am, etc.,

Worthing, July 13th. T. P. GOSTLING.

*** Dr. Cox states in reply: Major Astor was probably thinking of the negotiations about the war bonus for 1919 and the mileage grant. There have been no negotiations of any kind with regard to next year's capitation fee.

REFORM OF PUBLIC HEALTH ADMINISTRATION.

SIR,—To everyone concerned in public health administration in England it has now for long been evident that a radical reform is needed in the general methods of management of public health affairs throughout the country. This idea has been at the base of the movement to establish a central Ministry of Health, though single items of the general business such as "Housing" and "Infant Welfare" have been particularly used to help forward the movement by exciting a sufficiently pronounced public opinion.

The question now is: Are we going to get the reform which will go to the base of things and largely reconstitute the whole public health service? The most important initial proceeding required is the proper division of the country into districts of such extent and population as can be conveniently administered by a committee and staff appointed for that purpose in each such district.

The question of the position henceforward to be held by the medical officer of health is not second in importance to the reconstruction of districts. It is under his leading and advice that public health work proceeds and advances, and if this be true it must be openly recognized, and we must have done with the fiction that the work is wholly due to the committee or council, and that the medical officer of health is a mere dog under the table, who may be kicked but must never be heard to growl. To maintain this fiction is to court failure. The service of the medical officer of health will always be affected and modified by its recognition. It may be argued that this is small stuff, but it is human nature. In connexion with local councils the medical officer of health has suffered much, partly from his ill-defined duties and equivocal position, partly from the representation of private and trade interests upon local councils, and the personal prejudice which any active medical officer of health raises against himself in attacking subjects that touch local private interests. In regard to professional prestige and credit, and in his dependence upon the local council for appointment, permanence of office and proper payment, the position of the medical officer of health is intolerable, and his public service can never be satisfactorily rendered so long as such conditions of office are perpetuated. The new Health Ministry must make up its mind to that.

On the other hand, how is the new ministry going to be effective in local administration in order that henceforward the numerous laws and regulations shall not only come into existence but shall everywhere be put into effective operation? It can be best done by the medical officer of health becoming a State official, centrally appointed and controlled.

The medical officer of health, therefore, should cease to be subject to the control of the local council. Through and by him the central authority may hope to see administered the Public Health Acts and the regulations it formulates. With these officials its own, locally placed, the new central Health Ministry can be effective. Otherwise hardly so, even with an expensive duplicate staff, to be sent about the country to get what information they can at short notice by questioning local officials. The taking over of the medical officer of health by the State need not remove the consideration and execution of public health works from the local council or committee, which could exist much as hitherto, or in such form as may best be invented in regard to mode of election and powers. But the medical officer of health should be the adviser, reporter, and go-between, who would enlighten the central Ministry with exact information of local affairs, and authoritatively carry the views and recommendations of the central authority to the local council.—I am, etc.,

June 26th. M.O.H.

MEDICAL APPOINTMENTS UNDER THE MINISTRY OF PENSIONS.

SIR,—I also am a pre-war Territorial. I was in camp at annual training when mobilized, having made temporary arrangements for a fortnight's absence from my practice. Subsequently I sold out—at a loss of £1,000. I served overseas for over a year, until invalided home; since then I have held the appointment of officer in charge of medical division at two large military hospitals for eighteen months, and have recently attended a fortnight's post-graduate course on war injuries and diseases, bringing my knowledge up to date on all war disabilities. During the past three years I have been president of medical boards, so that my acquaintance with board routine is fairly thorough.

I applied to the Ministry of Pensions for an appointment; was requested to call when next in town. I made a special journey to Millbank, was told that they had no whole-time appointment available, and was advised to call on the Commissioner of Medical Service of the area in which I proposed to settle in private practice. Another journey; the Commissioner gave much information, especially as to the "region" I had selected, and advised me to visit the Deputy Commissioner for that "region," telling me there was a scarcity of men on his board panel and that I should get a fair amount of work there. Still

another journey; I found my letter of ten days earlier lying on the D.C.M.S.'s table—he "was going to answer it to-day." He had quite a full panel; I could take my turn with the others—about one session a week (£1 1s.). This D.C.M.S. had had no military service, but had qualified for his permanent appointment by serving under the National Service Ministry on recruiting boards. Of eight names on his panel, which I recognized, seven had never left their practices during the war. He called my special attention to three of them—"Good men; of course I could not displace them"! Total result, four days and five guineas wasted.

A similar case is that of my friend A. B., F.R.C.S.Edin. He threw up his good operative practice in the colonies on the outbreak of war, came home, joined up, served in Gallipoli six months until invalided home; has since been surgical specialist in military hospitals for two years, treating war wounds and their resultant disabilities. He also called at the Ministry of Pensions; he also was told that no whole-time appointments were available, and he was recommended to a certain medical agency, who "would perhaps find him a nice little practice somewhere." He took the kind official's letter of introduction to the agent, but has heard nothing further from either.

I ask: "What is the Association doing to help us?"—both old members. What is the Association doing to get into touch with us, and with the hundreds of R.A.M.C. officers serving in England, most of them non-members of the Association, and seeing nothing to be gained by joining it? Frankly, I must confess that I have great difficulty in proving to them any advantage in membership. I presume that meetings of Divisions and Branches are being held in the neighbourhood of our huge camps, but I have never seen any invitation to the R.A.M.C. officers stationed in these camps to attend any meetings. What lost opportunities for recruiting members!—I am, etc.,

July 8th. ANOTHER TERRITORIAL.

SIR,—I was interested in the letters on this subject in the JOURNAL of June 21st, p. 784, and July 5th, p. 27. Each one has stated a case for himself. But surely there is a very important "third party" who deserves consideration—I mean the pensioner.

"In Arduis Fidelis" has apparently forgotten that some of us who stayed at home did so by reason that we were not accepted on account of some infirmity, but that, nevertheless, we carried on important work at home. I myself did some eight or ten hours' recruiting every day for many months, in addition to working a fairly large general practice, the latter suffering very considerably thereby. We often examined sixty or eighty recruits for the pay of sixteen out of pure loyalty.

Now it is not given to every medical man (be he service man or civilian) that he should have the qualities necessary for a chairman of Pensions Board, nor even for an ordinary member of the board. The duties call for knowledge in a particular branch of our profession—for tact, discrimination, and sympathy (not sentiment). Are these attributes easily found? Do they happen to each man who has served, or who, by accident, has been relegated to "civilian" duty? "I hae ma doots."

Then, again, is it advisable for any young man to enter into this *cul-de-sac?* If I were the Minister of Pensions I should make my selection as follows:

1. Men who are serving in this capacity—who volunteered for service, and have given satisfaction.
2. Men who have received injuries or incapacities.
3. Older men who have served.

But I should endeavour, above all things, to get hold of the right men, both as chairman and member.—I am, etc.,

July 8th. NOT A CHAIRMAN.

SIR,—As a service man who has recently held an appointment under the Ministry I think the list suggested by "In Arduis Fidelis" should contain the following information:

1. How many medical officers are employed who have *never* held a commission in either navy or army.
2. What financial loss these gentlemen have sustained by such employment being given to them.
3. Is every medical officer employed of pure British descent and birth?

The correct answers to these questions would be enlightening and instructive.—I am, etc.,

July 8th. FAIR PLAY.

PROFESSIONAL FREEDOM.

SIR,—The menace of the Insurance Act to medical interests was so flagrant that for very shame the Government felt bound to devise machinery to protect us against themselves. The product of their ingenuity and of their justice was the Panel Committee; for which we, not they, must pay, however expensive our own means of defence may be; and for which many, if not most of us, must vote (if at all) by the scriptural method of the lot and prayer. Strangers to their very names, we have no other means of knowing their opinions and their capacities.

The particular committee which defends me has sent me a circular urging me to join a trade union. It is characteristic of the Insurance Act that it makes the pay a more prominent question than the patient. But it is none the less a shock to find the position that we are a class apart, whose interests are in conflict with the State's, frankly accepted by men who represent that tradition of self-effacing service which distinguishes a profession from a trade.

The man is blind, either wilfully or through political obsession, who does not see the superiority, from a public health point of view, of that system which, while exacting fees from the individual, raises his standard of living, and so tends to raise—and has in the past raised—the wage rate of his class, over that system which, while pretending to grant him medical attendance free, really exacts back the whole cost with cruel interest, and so tends to depress—and does in the present depress—the wage rate of his class as a whole.

When a man is paid by the State, unless his work is essentially a part of State function, as, for example, a soldier's or a judge's, his interests must conflict with those of the community especially of the poorest part thereof, who feel taxation most. It is the most malign feature of the Act that it establishes this conflict between us and the poor, of whom we have hitherto, we may justly boast, been reckoned the firm friends.

No right-minded man can bear, at this crisis especially, to think that he is adding one penny to the burden of the State. His first and overwhelming duty is to save for it every penny he can. Into this atrocious dilemma the Act has forced us: We must either submit to underpay, or we must add to the burden of the poor. We do not get enough; they already pay too much.

The medical trade union is avowedly to be modelled on the "workers'" union. We have had examples. We all know what suffering has been inflicted, as we [illegible]n its own members as on the poor, by the up-to-date political trade union, and how menacing has grown the tendency to exploit the nation for the benefit of individuals. We most of us suspect the suffering to have been futile—for example, it is almost certain that recently the miners actually lowered their real wages by insisting on higher money wages. That working men newly conscious of political power should attach a false importance to parliaments is a pardonable and a pathetic error. That we, educated in the observance of natural law, should imagine, in defiance of all history, that governments can directly raise or lower wages is childish folly.

My protectors tell me we are helpless without a trade union. Well, it is disagreeable to feel myself a puppet; but it is ridiculous to be a puppet in a fume. It is mean to revenge myself for puppetdom by filching from puppets more helpless still. The working class, like the scorpion under the burning glass, is striking out blindly in its agony at every object near, often—nay, always—wounding itself. It is this tragic folly they urge me to copy.

Seven years ago in this paper, I believe, it was prophesied that we would shortly be demanding an increase of pay by reason of the depreciation of money through taxation. The trade union scheme is but drawing the vicious circle with a larger and larger radius. Nay, it is playing the Government game. What could they ask better than to have a united and disciplined body to bargain with, at which they could point the finger of scorn on occasion, as advancing a sectional against the public interest? It would embarrass them far more if most of us refused to be bound either by a panel committee, or even the Association.

Thus, for any lasting results the trade union, for all its plausible sound, is an unpractical method. It will be up against natural law, and natural law will win. If it were not, it is up against the Government, and Government, with popular support, will also win. Herein we see the Nemesis of the mean and pettifogging attitude which the profession has generally adopted to the Act. We have treated it as a matter affecting our pockets and conditions of service rather than as a matter vitally affecting the nation. The men who have let loose this Prussian plague upon us have dressed themselves in the commandeered plumes of our charity, and acclaim themselves as benefactors to the race. We have let them do so. When we oppose any obstacles in their way, they are not slow to point the inference that we are enemies. We have given them a formidable start, but our position is still strong. No unbiassed man can look at our social history from 1896 onwards and not see that bureaucracy is under a terrible indictment. To attack that part of this policy which concerns us most nearly—the Insurance Act—for having increased poverty, disease, and death among the poor, and caused a moral deterioration not confined to the poor, is at once to alter the position entirely. The phenomena were patent before the war; now that the artificial demand for labour with its sequent high wages is past, they are re-emerging. It is very certain that our enemies could not be urging these extensions of baleful State control if, in season and out of season, they had to prove absence of complicity. But the phenomena are there; make them explain them away if they can, and keep them busy till they do. Attack is the best defence.

To make the Act voluntary would make it possible for us again to obtain proper pay without oppressing the poor, and make it once again possible for the poor to provide for themselves. The Council could do this in twelve months if they would, but they have fallen sick with the prevalent bulimia for officials. It remains for us of humbler pretensions but of more knowledge of the problems of the poor to see that Germany, vanquished in the military, does not win in the political, field. It does not even need a united profession for that. A hundred men, joining in various quarters in a fierce systematic and sustained attack on the Act, especially using the lay press, can create a suspicion and a mistrust which will make voluntaryism a test question at the next election. I appeal for helpers. —I am, etc.,

Rayleigh, Essex, July 3rd. B. G. M. BASKETT.

Obituary.

FREDERICK PAGE, M.D.EDIN., M.A., D.C.L.DURHAM, F.R.C.S.,
Newcastle-upon-Tyne.

ON July 3rd Mr. Frederick Page passed quietly away at the ripe age of 79. He had been in indifferent health for the last few years, so that in one sense the end was not unexpected. By his death Newcastle and the north of England have lost a distinguished surgeon. He was the son of Dr. Frederick Page, who many years ago was surgeon to the Portsmouth, Portsea, and Gosport Hospital, and may be said, therefore, to have been born with a taste for surgery.

The future Professor of Surgery at Newcastle was educated at the University of Edinburgh, and for a time held office in the Colonial Hospital, Perth, Western Australia. In 1870 he was appointed house-surgeon to the old Newcastle Infirmary, and when, four years later, he left the infirmary he was the recipient of many presents from patients and friends. Becoming associated with the late Mr. Septimus Raine, then surgeon to the North-Eastern Railway Company, whose jurisdiction extended from Berwick to Yorkshire, Mr. Page was frequently brought into public notice. On his appointment a few years later to be surgeon to the Infirmary he found the opportunities for which he had been waiting. It was in the operating theatre that he was seen to greatest advantage. A skilful and a quick operator, his results were extremely satisfactory. He was equally successful as a teacher, both in the wards of the Infirmary and in the College of Medicine. For several years he was lecturer in the college on medical jurisprudence. His lectures, which were carefully prepared, were enriched by facts drawn from experience. On the death of Professor G. Yeoman Heath, Mr. Page was appointed joint professor of surgery along with the late Professor Arnison. Page was nothing if not dogmatic, and to this circumstance he owed much of his success as a teacher, but it sometimes brought him into conflict with his colleagues.

The University of Durham in 1888 conferred upon him the degree of M.A. and subsequently the honorary degree of D.C.L. For a period he acted as examiner in surgery in Edinburgh University; he was consulting surgeon to several of the hospitals in Newcastle, was a J.P. for the city and county of Newcastle, and for several years vice-chairman of the local Licensing Committee.

To the medical journals Mr. Page was a frequent contributor. His written articles, like his lectures, were concise and to the point. As he was house-surgeon in the Infirmary when Lister's principles were fast coming into application, he had the opportunity of comparing the older methods of surgical treatment with the more recent. This experience he embodied in an interesting paper, "The results of the major amputations treated antiseptically in the Newcastle Infirmary, 1878–98."

Mrs. Page, who was the daughter of Mr. John Graham and niece of Professor Graham, F.R.S., a well known chemist and at one time Master of the Mint, predeceased her husband. Their family consisted of one son, Colonel Cuthbert Page, who is in the artillery, and two daughters, both of whom were married. After the sudden death of his younger daughter in Australia a few months ago, Mr. Page was never quite the same. In the later weeks of his life he was buoyed up by the hope of seeing his elder daughter, who also lived in Australia, but he died while she was on the voyage homeward. A halo of sadness encircled the passing of Mr. Page, for of his relations only his sister was with him; and Colonel Page, who is at present ill in a London hospital, was unable to be present at the funeral. All that was mortal of Frederick Page was laid to rest in Jesmond Old Cemetery on July 5th, amid indications of the deep respect in which he was held by his colleagues, friends, and admirers.

ROBERT CRAIG MACLAGAN, M.D., F.R.C.P.EDIN.,
Edinburgh.

DR. R. CRAIG MACLAGAN, who died at his house in Edinburgh on July 12th, was a son of the late Sir Douglas Maclagan, professor of medical jurisprudence and public health in the University of Edinburgh, and one of a highly distinguished and gifted family of brothers, one of whom was the late Archbishop of York.

Dr. Craig Maclagan was born in 1839, was educated at the Royal High School and University of Edinburgh, graduated M.D. in 1860, became a Member of the Royal College of Physicians of Edinburgh in 1865, and a Fellow in 1867, and was also elected a Fellow of the Royal Society of Edinburgh. Early in his medical career he made special investigations in connexion with the arsenic eaters of Styria, to which Sir Thomas Fraser in his lectures on materia medica used to refer as of high scientific value; the results were published in the *Edinburgh Medical Journal* in 1864 and 1875. For a time he practised as a physician in Edinburgh, but of late years his deafness and his interest in many other matters took him out of the ranks of the medical men in active practice. Among the other matters may be named Dr. Maclagan's early and long-continued interest in the Volunteers, his name being the first on the list which became the roll of the University or No. 4 Company Volunteer Battalion, Royal Scots; he became colonel of the 5th Battalion, and afterwards honorary colonel, a rank which he resigned in 1909. He was also greatly interested in folk-lore and anthropology, and wrote on these subjects. He was likewise one of the founders of the Scottish Association for the Medical Education of Women.

He had a singularly attractive manner, an air of distinction, an energetic way, and an upright carriage, which all combined to make him an easily recognized figure in the streets of Edinburgh. His death in his 81st year makes a gap in the ranks of the modern Athenians who were born in the first half of the nineteenth century.

ROBERT ABERNETHY, M.D., F.R.C.P.EDIN.,
Edinburgh.

DR. ROBERT ABERNETHY, whose death at the comparatively early age of 52 took place at Bridge of Allan on July 8th, was a nephew of the late Dr. Brakenridge, one of the

physicians to the Edinburgh Royal Infirmary. He graduated M.B., C.M. in Edinburgh University in 1888, M.D. in 1893, and became a member of the Royal College of Physicians in 1892 and a Fellow in 1893. On Dr. Brakenridge's death in 1895 Dr. Abernethy succeeded to his practice, and for many years held an honoured position among the physicians of Edinburgh. Some months ago he suffered severely from influenza, and from this he never completely recovered. He was one of the physicians of the New Town Dispensary, honorary physician to the National Society for the Prevention of Cruelty to Children, and held other appointments in the city. He was the author of a communication on a case of dwarfing, with peculiar deformity of the hands and feet, published in 1898.

He will be greatly missed, for his quiet, kind, and courteous way had made him many strong friends. He was buried in the Dean Cemetery, Edinburgh, on July 11th, after a funeral service at St. John's Episcopal Church, Princes Street.

Universities and Colleges.

UNIVERSITY OF OXFORD.

AT a Congregation held on July 5th the degree of Master of Surgery was conferred upon Ronald Ogier Ward.

UNIVERSITY OF MANCHESTER.

THE following gentlemen have obtained the diploma in Public Health:

A. W. Baker, G. H. T. N. Clarke, C. J. Crawford, C. C. Hargreaves, A. Heath, J. L. Meynell, E. N. Ramsbottom, H. F. Sheldon, E. H. Walker.

UNIVERSITY OF BIRMINGHAM.

THE registrar of the University of Birmingham gives notice that the Walter Myers Travelling Studentship of the value of £150 a year, tenable at a university or hospital not in Great Britain or Ireland, is open to candidates of either sex under 30 years of age who are graduates in medicine of the University of Birmingham or graduates in science of either Birmingham, London, Cambridge, or Oxford.

UNIVERSITY OF BRISTOL.

THE following candidates have been approved at the examinations indicated:

FINAL M.B., CH.B. (*Part I only—including Forensic Medicine and Toxicology*).—Hilda M. Brown.
D.P.H.—A. E. Wilson.

UNIVERSITY OF EDINBURGH.

THE summer graduation ceremony took place on July 10th, when a large number of ordinary degrees and thirty-six honorary degrees were conferred. Among the recipients of the honorary degree of LL.D. were Sir Thomas Fraser, Professor Rutherford Morison, Professor Noël Paton, and Dr. A. R. Ross.

Of Sir Thomas Fraser the Dean of the Faculty of Law said that no single sentence could sum up all that Sir Thomas Fraser's forty years' tenure of the chair of materia medica had meant to the Edinburgh medical school. It had shared the credit of his original investigations and beneficent discoveries, it had enjoyed the advantage of his inspiring teaching and great clinical skill, and owed much also to the constructive faculty and strong personality he brought to bear on all administrative problems.

Of Mr. Rutherford Morison it was said that, initiated into surgery under Dr. Heron Watson, he rapidly made a name as a fearless and skilful operator and a pioneer in certain departments of practice. He had recently retired from the chair of surgery in the University of Durham College of Medicine, Newcastle, after a long and distinguished career, during which he made many valuable contributions to the science and practice of his art and had introduced improvements in the treatment of septic wounds which had proved efficacious in military surgery.

To a name famous in the annals of Victorian art Professor Noël Paton had added fresh lustre in the realms of science. The Edinburgh medical school which reared him did not grudge the sister school in the west the advantage it had reaped from the full fruition of his powers in the chair of physiology at Glasgow.

The Dean, in presenting Brigadier-General A. R. Ross, C.B., C.M.G., said that he had seen service first as a private and then as a surgeon in the South African war, and in 1914 had quitted his chair at Kingston to accompany the first Canadian Division to France, where he shared its fortunes at Ypres and the Somme and was wounded during the magnificent assault on Vimy Ridge. He had been advanced step by step until in August, 1918, he became D.M.S. Canadian Section G.H.Q., France.

The following medical degrees were conferred:

M.D.—*A. C. Alport (Captain R.A.M.C.), †R. G. Archibald, D.S.O. (Major R.A.M.C.), *R. G. Bannerman, F. A. F. Barnardo, C.I.E. (Colonel I.M.S.), †E. Bramwell, F. R. Bremner, A. W. T. Buist (Lieut.-Colonel I.M.S.), †D. M. Callender, *D. H. D. Cran, *G. Fitzgerald, W. B. Harry, K. G. Hearne, J. B. Hogarth, M. J. Johnston, *R. Lawson, E. L. Middleton, R. R. Murray, *W. H. Parkes, C.B.E., C.M.G. (Colonel N.Z.M.C.), Dhanavada Samuel Ramachandra Rao, A. Romanes, A. W. S. Sichel, R. S. Stevenson, S. H. Stewart, *E. L. White.

M.CH.—†J. M. Graham.

M.B., CH.B.—H. M. Anderson, A. Armit, A. Badenoch, H. Berelowitz, J. J. R. Binnie, ‡Alice Bloomfield, C. G. Booker, ‖P. M. Brodie, C. C. Brown, R. M'C. Burnie, §L. S. P. Davidson, F. J. Deane, A. A. Denham, R. L. Galloway, K. Gillis, ‖M. Goldberg, A. T. Harris, Marjorie Harris, C. E. L. Hole, Jiwanda Ram Katariya, Marjorie H. King, §R. L. Langley, R. Kho Seng Lim, §H. S. Lucraft, J. C. Macartney, J. M'Intyre, Ella G. F. MacKenzie, R. D. Mackenzie, R. Macnair, Mona Macnaughton, Elizabeth M'Vicker, Mabel S. Martin, G. H. H. Maxwell, J. H. Meiring, A. M. Moll, J. O. Murray, A. V. T. Musto, E. P. O'Dowd, Acrath Narayanan Nanoo Panikker, C. W. Patterson, J. R. Payn, H. S. Plowman, E. H. Ponder, Mary S. Poole (*née* Paterson), ‖W. G. Robson, Beatrice A. S. Russell, R. Sandilands, Mahmoud Zaky Sheriff, B. S. Simpson, W. A. Slack, V. A. Stooks, A. K. Towers, Maung Sein Tun, B.A., P. C. Uys, J. R. de Villiers, G. R. Waller, R. B. Watson, A. G. N. Weatherhead, J. S. Westwater, J. L. Wilson, D. F. Yuille.

D.T.M. AND H.—A. Bremner.

* Commended for thesis.
† Highly commended for thesis.
‡ Awarded Gold Medal for thesis.
§ Passed with first class honours.
‖ Passed with second class honours.

The following prizes and scholarships were also presented:

Thesis Gold Medallist and Chiene Medal in Surgery.—J. M. Graham.

Ettles Scholarship and Leslie Gold Medal.—R. L. Langley.

Allan Fellowship in Clinical Medicine and Clinical Surgery.—P. M. Brodie.

Beaney Prize in Anatomy and Surgery and Mouat Scholarship in the Practice of Physic.—R. L. Langley.

Conan Doyle Prize.—M. Goldberg.

Annandale Gold Medal in Clinical Surgery, James Scott Scholarship in Midwifery, Scottish Association for Medical Education of Women Prize, and the Dorothy Gilfillan Memorial Prize.—Alice Bloomfield.

Buchanan Scholarship in Gynaecology.—H. S. Lucraft.

Pattison Prize in Clinical Surgery.—J. L. Wilson.

Cunningham Memorial Medal and Prize in Anatomy.—J. R. M'Donald.

UNIVERSITY OF GLASGOW.

The following candidates have been approved in the examinations indicated:

THIRD M.B., B.CH. (*M.* = *Materia Medica and Therapeutics, P.* = *Pathology*).—A. G. Aitken (P.), W. R. Allan (M.), A. R. Black (M.), J. J. Black (M.P.), A. W. Borland (P.), R. K. Duguid (M.), P. A. Faichney (M.), P. B. Farrar (M.P.), W. J. Ferguson (M.P.), R. Fletcher (M.), C. Glen (P.), C. N. Gordon (P.), A. Gray (M.), J. M. Hain (M.P.), W. M. Hamilton (M.P.), J. K. Holmes (M.P.), T. O. Howie (P.), H. W. Howieson (P.), *P. Hutchison (P.), T. T. Hutchison (P.), B. Isaacs (P.), L. M. Johnston (M.), W. L. Kennedy (M.P.), J. Leishman (M.), A. L. M'Adam (P.), H. J. Macbride (P.), J. W. M'Conville (M.), J. Macfarlane (P.), W. M. MacFarlane (M.), K. Mackenzie (P.), H. M'Kerlie (M.P.), H. H. MacKinnon (P.), A. H. M'Lean (M.P.), J. C. M'Naught (P.), A. M'C. Macqueen (M.P.), T. D. Marshall (M.P.), C. Melville (M.), P. Milligan (M.P.), J. T. Moffat (M.), G. W. Murray (P.), J. S. M'L. Ord (M.P.), J. Prentice (P.), T. D. Pyle (M.), D. Reid (M.), I. C. Robertson (P.), K. M. Rodger (M.P.), I. MacR. Sandilands (P.), T. S. Sargent (P.), W. H. Scott (M.P.), J. Shulman (M.), A. W. Sinclair (M.), H. V. Sweeney (M.P.), G. Tudhope (M.P.), J. C. Watt (M.), C. M. Whiteford (M.P.), R. H. Williamson (P.), J. D. Whiteford (P.), G. S. Wilson (M.P.), J. H. Wilson (M.), J. Wilson (M.), Alice A. Alexander (P.), Annie M. Alexander (P.), Rosa Bass (P.), Elizabeth E. Brown (P.), Elizabeth M'V. J. Currie (M.P.), Margaret Davidson (P.), Lilian M. Dickson (M.P.), Mary D. Gilmour (M.P.), Mary A. Grant (M.), Beryl Grieve (M.), Marion P. Hogg (P.), Annie W. Humble (P.), Susan M. S. Jamieson (M.P.), Elizabeth K. B. Lockie (M.P.), Edith M. F. M'Gill (M.P.), Janet S. S. Mackay (P.), Mary H. Maclachlan (M.P.), Grace M'Lintock (M.P.), Ashie Main (M.P.), Laura M. D. Mill (P.), Hettie M. W. Miller (M.P.), Margaret R. Oulton (M.P.), Catherine A. B. Pettigrew (P.), Annie G. Pollock (M.), Annabella A. Reid (M.), Enid A. Robertson (M.P.), Rebecca E. Roulston (P.), Jessie G. Service (M.P.), Marion Smellie, M.A. (M.P.), Margaret Sproul (P.), Janet F. Steel (M.P.), Jane W. Stocks (M.P.), Christina S. Stoddart (P.), Eva M. Sturrock (M.P.), Edith I. Thornley (M.P.), Eleanor M. Torrance (M.), Elizabeth Wheatley (M.P.), Janette R. Wilson (M.), Elizabeth R. Wyllie (M.P.), Elizabeth Young (P.).

Medical Jurisprudence and Public Health: Helen F. Allinson, *J. W. S. Blacklock, G. M. Cooper, Elizabeth S. Inglis, A. B. Macdonald, A. M'C. Macintosh, D. MacKenzie, T. S. Stirling, N. E. Stone, J. L. Turpie, J. D. Williamson.

Anatomy (with distinction): J. R. Learmonth, A. L. Taylor.

Physiology (with distinction): T. M. Burton, L. P. Foyer, R. C. Garry, J. Grant, E. E. Henderson, J. R. Learmonth, Catherine M. Buchanan, Catherine Harrower, Ellen D. Morton, Elizabeth C. Rodger, Mary M. Stevenson.

UNIVERSITY OF ABERDEEN.

A GRADUATION ceremony was held on July 11th, when the following degrees were conferred:

LL.D. (*Honoris Causa*).—Sir James Cantlie, K.B.E., Emeritus Professor John Theodore Cash, F.R.S., Sir David Hardie, M.D. (Brisbane, *in absentia*), Surgeon Vice-Admiral Sir James Porter, K.C.B., K.C.M.G. (late Director-General, Naval Medical Department), John Scott Riddell, M.V.O., C.B.E., M.B. (Director of the North-Eastern District, Red Cross Society, Scottish Branch).

M.D.—*F. J. Browne, †W. W. Ingram, ‡A. G. B. Duncan (Captain R.A.M.C.), ‡A. R. Fraser (Captain R.A.M.C.), G. Adam, Ratan Edulji Dastur, A. S. Leslie (Major I.M.S.), D. M. Marr (Major R.A.M.C.), C. M. Nicol (Major R.A.M.C., T.F.).

* Highest honours for thesis. † Honours for thesis.
‡ Commendation for thesis.

M.B., CH.B.—†** E. A. Gammie, †* C. O. Gordon, †**G. A. Shepherd, J. Allan, Annie Anderson, W. Anderson, Margaret M. Chapman, J. S. Cook, J. C. T. Crowden, *Elizabeth M. Dow, Dorothy M. J. Emslie, W. A. Falconer, J. Fiddes, A. C. Fowler, J. I. Hutcheson, Mary V. Littlejohn, Bethia M. Newlands, Margaret Porteous, L. S. Robertson, K. S. Rodin, Irene T. J. Ruxton, H. Third, A. Thomson, Louise Tomory.

* With "distinction." ** With "much distinction."
† With second class honours.

The John Murray Medal and Scholarship, granted to the most distinguished graduate (M.B.) of 1919, has been awarded to G. A. Shepherd.

UNIVERSITY OF DUBLIN.

TRINITY COLLEGE.

THE following candidates have been approved at the examinations indicated:

FINAL M.B., PART I.—*Materia Medica and Therapeutics, Medical Jurisprudence and Hygiene, Pathology:* *A. V. J. Russell, *G. H. Davis, *T. Radloff, *E. C. Smith, *F. V. Small, J. Hirschmann, H. O. Hofmeyer, J. F. Wicht, M. E. McBrien, Margaretta T. Stevenson, C. E. McQuade, Essie S. Smyth, Emily E. G. Baillie, B. Moshalowitz, T. F. L. Cary, Nannette Norris, W. R. Burns, J. H. B. Crosbie, W. B. Briggs. *Pathology only—completing examination:* J. A. Acheson. *Materia Medica and Therapeutics, Medical Jurisprudence and Hygiene:* J. R. Craig, F. Y. Pratt, R. S. Chapman, T. G. Warham, J. D. Thompson, A. S. Bradlaw, W. H. Smith, R. V. Dowse, J. C. Brennan, H. A. Lavelle.

PART II.—*Medicine (M.B.):* C. D. Brink, J. C. J. Callanan, W. F. McConnell, J. S. Quin, G. F. Keatinge, L. J. Nugent, Jessie Gilbert, Mary C. Sheppard, T. J. R. Warren, E. S. E. Mack, A. W. D. Magee, S. J. Laverty, *H. B. Van der Merwe, V. G. Walker. *Surgery (B.Ch.):* J. S. Quin, A. H. Thompson, R. Counihan, C. J. Quinlan, T. J. R. Warren, Gertrude Rice, B. FitzJ. Haythornthwaite, F. W. Godbey, C. G. Ambrose, W. J. Hogan, T. Madill, P. Casey, F. J. Dymoke, A. W. D. Magee. *Midwifery (B.A.O.):* *L. Abrahamson, *F. W. Robertson, *J. G. Holmes, J. H. Coolican, Janie M. Cummins, H. Cohen, C. D. Brink, Eileen H. Dowse, T. Madill, R. E. Murphy, T. D. Gordon, F. J. G. Battersby, A. R. Aidin, S. R. Hill.

D.P.H., PART I.—*Chemistry, Physics and Meteorology, Bacteriology and Pathology:* H. C. Mulholland, B. Lyons, G. Marshall, C. E. Moore, C. W. C. Robinson.

PART II.—*Sanitary Engineering, Vital Statistics and Public Health Law, Hygiene and Epidemiology:* H. C. Mulholland, B. Lyons, R. Condy, G. Marshall, C. W. C. Robinson, C. E. Moore.

* Passed on high marks.

QUEEN'S UNIVERSITY, BELFAST.

THE summer graduation ceremony was held on July 9th, when the following degrees and diplomas were conferred:

Honorary.

LL.D.—The Earl of Shaftesbury, Viscount Bryce, Sir John H. Macfarland, Chancellor of the University of Melbourne, and the following members of the medical profession: Lieut.-Colonel Robert McCarrison, I.M.S., a graduate of the university, in recognition of his investigations into the causes of goitre and cretinism. Dr. Johnson Symington, for twenty years Professor of Anatomy in the University, and now Emeritus Professor.

D.SC.—Sir David Semple, late R.A.M.C., a medical graduate of the university, formerly assistant of pathology in the Army Medical School, Netley, and director of the Pasteur Institute, India.

M.D.—Professor J. G. Adami, F.R.S., Vice-Chancellor of the University of Liverpool, and lately Professor of Pathology in McGill University, Montreal, in recognition of his researches in pathology. Dr. Alexis Carrel, Director of the Rockefeller Institute of Experimental Medicine, New York, and during the war medical officer of the Special Research Hospital of the French Army. Professor Harvey Cushing, of Harvard University. Lieut.-Colonel J. A. Sinton, V.C., I.M.S., formerly Riddell Demonstrator in Pathology at Queen's University, in recognition of his early distinctions and of his valour in the field while engaged in the treatment and succour of the wounded.

Ordinary.

M.D.—Eileen M. Bell (with distinction and gold medal), N. Beattie, J. Corker, Caroline V. Lowe, J. Lyons, P. P. Wright.

M.CH.—R. J. M'Connell (with distinction), T. P. M'Murray, W. A. Thompson.

M.B., B.CH., B.A.O.—*H. M. Calwell, *S. Simms, †J. Camac, †R. N. Deane, †A. M'Faul, †H. I. Taggart, W. R. Abernethy, S. Ballantine, H. Carson, T. J. A. Connolly, E. A. Davison, S. Hall, B. Herbert, J. M. Hosey, D. J. M'Gurk, W. C. M'Kee, T. H. M'Kenna, Mary M. Merrick, R. Nimmons, D. G. Roulston, A. M'M. W. Segerdal, Ruth M. Slade, H. W. Wild.

D.P.H.—Ivie Aird, J. B. Alexander, S. T. Beggs, J. Boyd, L. D. I. Graham, W. M'Dermott, E. B. C. Mayrs, T. Milling, F. A. E. Silcock, J. Tate, P. S. Walker, G. Wilson.

* First class honours. † Second class honours.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

A QUARTERLY Council was held on July 10th, when Sir George Makins, President, was in the chair.

Diplomas of Public Health were granted to twelve candidates found qualified at the recent examinations.

Sir George Makins was re-elected president, and Sir Anthony Bowlby and Sir John Bland-Sutton were elected vice-presidents for the ensuing year.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

THE following gentlemen, having passed the requisite examinations, have been admitted Fellows:

J. I. Baeza, R. Chalmers, J. Erlank, A. S. Gillett, E. S. B. Hamilton, M. B. Lawrie, G. Millar, Sengarapillai Ponniah, A. T. Roberts, G. J. C. Smyth, H. H. V. Welch, J. B. Young.

The Services.

HONOURS.

BAR TO MILITARY CROSS.

A BAR to the Military Cross has been conferred by Major-General Maynard in pursuance of powers vested in him by His Majesty the King upon Captain Frederick George Flood, M.C., R.A.M.C.(S.R.), for conspicuous gallantry and devotion to duty in North Russia. The following is the official record of the act for which the award has been made:

During operations at Vigozero and Petrovski Yam on March 18th, 1919, he dressed wounded under heavy machine gun and rifle fire, and under most trying conditions saved many lives. After the action he successfully evacuated all the wounded over sixty versts of most difficult country without losing a case. He showed great gallantry and marked ability and devotion to duty. (M.C. gazetted June 18th, 1917.)

Mentioned in Dispatches.

A series of Supplements to the *London Gazette* have been issued containing lists of names of those deserving special mention, in continuation of Field Marshal Sir Douglas Haig's dispatch of March 16th, 1919. In addition to 23 consultants mentioned, the number of officers of the Army Medical Service and the Royal Army Medical Corps, Special Reserve, Territorial, and Temporary, is 585. A subsequent list contains the names of 77 officers of the Canadian Army Medical Corps, 75 officers of the Australian Army Medical Corps, 7 officers of the New Zealand Medical Corps, 4 officers of the South African Medical Corps, and 10 officers of the Medical Corps of the American Expeditionary Force.

Foreign Decorations.

The following are among the decorations and medals awarded by the Allied Powers for distinguished service during the course of the campaign:

Conferred by the President of the United States of America.

American Distinguished Service Medal.—Lieut.-General Sir T. H. J. C. Goodwin, K.C.B., C.M.G., D.S.O., K.H.S., Director-General Army Medical Service; Major-General (temporary Lieut.-General) Sir C. H. Burtchaell, K.C.B., C.M.G., K.H.S.

Conferred by the President of the French Republic.

Légion d'Honneur: Officier.—Major-General Sir Menus William O'Keeffe, K.C.M.G., C.B.

Croix de Guerre.—Major-General Sir Harry Neville Thompson, K.C.M.G., C.B., D.S.O.

Conferred by the King of the Belgians.

Croix de Guerre (Belgian).—Captain Douglas Stuart Stevenson, M.B., M.B.E., 217th Squadron.

Conferred by the King of Hellenes.

Officer of the Order of George I.—Surgeon Commander Edward C. Sawdy, R.N.

Medical News.

DR. GEORGE A. BUCKMASTER, assistant professor of physiology in the University of London, has been appointed Henry Overton Wills professor of physiology in the University of Bristol.

DR. THOMAS LEWIS, F.R.S., lecturer in cardiac pathology at University College Hospital, has been appointed by the Minister of Pensions an honorary consultant physician to the Ministry.

A MEETING of the Section of Surgery of the Royal Society of Medicine will be held on Tuesday next at 5 p.m. to consider the propriety of forming a subsection of urology.

THE Right Hon. Christopher Addison, M.D., M.P., Minister of Health, has provisionally promised to deliver the inaugural address at the opening of the session at the London (Royal Free Hospital) School of Medicine for Women on Wednesday, October 1st, at 3 p.m.

THE Welsh Consultative Council under the Ministry of Health is to consist of not more than thirty persons, who will advise in connexion with matters relating to national insurance (approved societies' work), medical and allied services, local health administration, and general health questions in Wales.

THE Royal Society announces that two John Foulerton studentships will shortly be awarded for original research in medicine, the improvement of the treatment of disease, and the relief of human suffering. Researches must be carried out under the supervision and control of the Royal Society. The studentships are of the value of £400 each, and are tenable for three years, but may be extended to a total period of six years. Candidates must be of proved British nationality; both sexes are eligible. Particulars can be obtained from the assistant secretary of the Royal Society, Burlington House, Piccadilly, W.

THE annual dinner of the West London Medico-Chirurgical Society, which had been suspended during the war, was held at Pagani's Restaurant on July 10th, under the chairmanship of the President, Lieut.-Colonel E. M. Wilson, C.B., C.M.G., D.S.O., R.A.M.C. More than 100 members and visitors were present. After the loyal toasts had been honoured, the health of the Imperial Forces was proposed by Dr. Seymour Taylor, consulting physician to the West London Hospital and a former president of the society, who paid a tribute to the fighting men of the empire and to the work of the medical services throughout the war. The toast was responded to by Sir Peter Freyer, K.C.B., who spoke of his visit to the Grand Fleet and of the paternal care of the Indian Medical Service officers for the native troops, who came 6,000 miles across the "black waters" to fight for England and freedom. Dr. George Pernet proposed the toast of "Kindred Societies and Guests," and Mr. Spencer Leigh Hughes, M.P., made a witty reply. Sir Humphry Rolleston, K.C.B., President of the Royal Society of Medicine, in submitting the toast of the West London Medico-Chirurgical Society, spoke in sympathetic terms of the good done by the society in fostering comradeship among its 500 members, and paid a tribute to the work of two who in their lifetime did much for the society and the West London Post-Graduate College—Mr. C. B. Keetley and Mr. Leonard Bidwell. The President made an appreciative speech in reply, and an extremely enjoyable evening was brought to a close with the toast of "The Chairman," proposed by Dr. H. Chambers, editor of the *West London Medical Journal*.

Letters, Notes, and Answers.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

The postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2631, Gerrard.
2. ACTING FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Medisecra, Westrand, London;* telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin.

QUERIES AND ANSWERS.

"M.D.," who is acquainted with ordinary literature on hydatids, asks whether any recent therapeutic measures have been introduced, such as *x* rays, "606," or antimony.

MUCOUS COLITIS.

"PERPLEXED" would be glad to receive suggestions for treatment in a case of mucous colitis of several years' duration in an unmarried woman, aged 23 years. Lavage of the colon, intestinal antiseptics, etc., have only partially relieved the symptoms, and an exploratory laparotomy, during which the appendix was removed, showed no lesion which would explain the condition otherwise.

VACCINATION AGAINST CORYZA.

DR. J. TEARE.—The percentage of successes and the length of immunity after vaccination against coryza are very variable with any stock vaccine, and autogenous vaccines are the best, but many failures occur. The inoculations should be made, say, once a week, and may be begun during the later stages of an attack of coryza. There is rarely any reaction, but occasionally the coryza is exacerbated. Vaccines (autogenous) are not often of much use in bronchitis, except in cases of infection by Friedländer's bacillus. Our correspondent may consult R. W. Allen's *Practical Vaccine Treatment.* (London: H. K. Lewis. 1919. 7s. 6d. net.)

CRANIUM AND PELVIS.

A. C.—The lower jaw and zygoma have nothing to do with the shoulder girdle, they are developed in the branchial arches. The mandible, or lower jaw, has long been known to have its origin, very early in fetal life, in the first arch, the hyoid in the second, while the cartilages of the larynx—of which there is no homologue in relation to the pelvis—are formed within the fourth or fifth arches. The superior maxillary process, or protuberance on the first arch, gives origin to the malar, (superior) maxillary, and other bones. The sacrum and coccyx are vertebral bones, like the cervical vertebrae, part of the same column, but not "homologues." No vertebrate animal, not even *Amphioxus*, is so simple that the caudal end of the body is the same as the cephalic, so that the coccygeal bones, or the soft structures in relation with it, are not in the least like the cranial bones, or the cerebrum and organs of sight, hearing, smelling, and tasting for the benefit of which the skull is developed. The relation between the nasal and genito-urinary tract can in no sense be anatomical, as the development of the nasal fissure is quite different from the evolution of the structures which form the kidneys, prostate, testes, ovaries, uterus, and vagina.

LETTERS, NOTES, ETC.

MEDICAL FEES.

DR. GEOFFREY PRICE (Kineton, Warwick) writes to suggest that the time has come for the British Medical Association to institute a general advance of 50 per cent. in medical fees for the present standard of work.

FATHER AND SON.

DR. MICHAEL GRABHAM, who from St. Thomas's Hospital took his first diploma fifty-eight years ago and became a Fellow of the Royal College of Physicians of London forty-two years ago, has recently been presented by the British community of the island of Madeira, where he has practised so long, with a silver casket containing an illuminated address. Dr. Grabham very hospitably entertained his friends on this occasion, for is not his cellar of Madeira as rare as his skill on the organ? Almost at the same time his son, who is medical officer of the Jubilee Hospital, Kingston, Jamaica, received from the members of the staffs and nurses of that hospital and of the public hospital an address, accompanied by a present, on the occasion of his coming on leave to England. The address recalled Dr. Grabham's long connexion with these institutions and the pains he had taken in giving instructions to the nurses in the maternity hospital. In response, Dr. Grabham gave an outline of the history of the hospital from its inception twenty-seven years ago, when he first became connected with it.

PROFESSIONAL CONFIDENCE.

V. N. R. writes: The case which forms the subject of an editorial article and a letter from Sir John Tweedy in your issue of July 5th is interesting. Here is another, which brings in another element, but is, I think, worth quoting:

A friend of mine serving in the forces in a part of the country where civilian practitioners were very few, was called out to see a woman who was said to have had a miscarriage. He arrived and found his patient moribund, and, in spite of his efforts to resuscitate her, she died very shortly after his arrival. He saw, if I remember rightly, a fully-formed placenta but no fetus. He did not feel justified under the circumstances in giving a certificate of death, and on the police making inquiries, a full-term child was found with a ligature round its neck.

Following the argument of the previous case, then, had this woman lived he would have been wrong to take any action, even though he knew or suspected that a crime had been committed. The woman's death brought in a different element, but did it free the medical man from the obligations of professional confidence? Fortunately, such cases are not common, but any medical man may be caught unawares by one. It is well to know, therefore, in cases where professional duty and the law seem to conflict, which should the medical man follow. And if he follows his duty, even to becoming accessory after a crime, is he liable to legal proceedings, and, if so, is the plea of professional confidence a good defence?

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 35, 39, 40, 41, and 42 of our advertisement columns, and advertisements as to partnerships, assistantships, and locum tenencies at pages 36, 37, and 38. Among the announcements of appointments vacant will be found a long list from the Egyptian Government School of Medicine, Cairo, including professorships in chemistry, anatomy, biology, pharmacology, and surgery, and lectureships in biology, anatomy, physiology, and pathology.

THE following appointments for certifying factory surgeons are vacant: Ascot (Berks), Dundee (Forfar), Falkland (Fife), Lavenham (Suffolk), Llanfair Caereinion (Montgomery), Newhaven (Sussex), Nottingham North (Nottingham), Scarborough (Yorks, North Riding), Tynemouth (Northumberland), Wallsend (Northumberland), Yetholm (Roxburgh).

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